ITEMS OF INTEREST.

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Thoughts from the Profession.

HUMAN PHYSIOLOGY.

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(CONTINUED FROM PAGE 276.)

Of the three methods of feeding infants,—by cup, spoon, or nursing bottle, the latter most fully accords with the indications of nature. It prevents food of too solid consistency passing into the stomach, and allows only of its gradual introduction. Gastric trouble at all ages is often the result of too hasty deglutition. The act of sucking, too, carries down into the stomach the juices of the mouth, and stimulates the secretion of the other digestive fluids.

The stomach normally undergoes no movements until food is passed into it, but the presence of food slowly establishes its physiological activity.

Regurgitation of a portion of the contents of the stomach, is not strictly a physiological action, although of frequent occurrence, particularly in early life. It is mostly due to overloading or to some other disturbed state. The discharge of gases from the stomach through the œsophagus and mouth is quite common, and is termed eructation.

INTESTINAL DIGESTION.

The small intestine is a very important portion of the digestive system. In it is accomplished the final work of preparing food for absorption. It extends from the pylorus to the ileo-cæcal valve. By a double fold of the mesenteric membrane it is attached to the spinal column and held in position. This membrane forms the external coat of the tube, and is about four inches in width in the portions acting as

a stay to the intestines. The length of the small intestine is about eighteen feet, and its diameter about an inch and a quarter, but, being a distensible tube, the measurements are only approximate. It is a continuous tube, but for convenience is artificially divided into the duodenum, jejunum, and ileum.

The first twelve inches is called the duodenum. It is larger than the lower part, and is sometimes so distended as to be called the lesser stomach. It has three coats—an external, serous; a middle, muscular; and an internal, mucous. Excluding the duodenum, the upper two-fifths of this tube is known as the jejunum, so called on account of its being empty after death; the remainder is termed the ileum.

The mucous membrane of the small intestine is highly vascular, has a soft, velvety appearance, and presents the valvulæ coniventes, the glands of Brunner, the follicles of Leiberkuhn, the vili, and the patches of Peyer.

The valvulæ coniventes are but duplicatures of the mucous membrane of the intestine. They commence about the middle of the duodenum, and extend throughout the jejunum, and become gradually lost in the ileum. These folds are always transverse, and occupy about one-third of the circumference of the tube. Their function is to increase the mucous surface of the intestine, and possibly to retard the passage of its contents.

The glands of Brunner are racemous and scattered here and there throughout the surface of the duodenum, but aggregated in its first half. As they do not exist elsewhere, they are termed the duodenal glands. They agree in structure perfectly with the racemous glands of the oral cavity and œsophagus. Their secretion is an alkaline mucus in which no formed elements exist, and is probably merely subservient to mechanical ends.

The follicles of Leiberkuhn are tubular glands, and are found throughout the small and large intestine. They are narrow, straight tubules, and though sometimes enlarged at their extremities, they are rarely bifurcated. Their structural composition consists of a delicate homogeneous membrane, lined by a single layer of columnar epithelium, which, even during chylification, never contain fat. Their cavity is filled by a clear fluid secretion—the so-called intestinal juice.

The vili are chiefly concerned in absorption, and will, therefore, receive consideration under that head. It may, however, be proper to state here that they are situated throughout the entire small intestine, but not found beyond the ileo-cæcal valve, and are simple elevations of the mucous membrane, provided with blood vessels and lacteals.

The patches of Peyer are rounded, flattened organs, invariably situated along that surface of the intestine which is opposite to the attachment of the mesentery. They are most abundant in the ileum, not

uncommonly met with in the lower part of the jejunum, and are occasionally found in the duodenum itself. Minutely examined, they seem to be an aggregation of closed follicles, lying partly in the mucous and partly in the sub-mucous tissues. There is no opening leading to them. Just above the follicle is generally a small opening in the mucous membrane, which leads to a cavity, into the base of which projects the pointed end of the follicle. Each follicle consists of a strong capsule of connective tissue, enclosing a semi-fluid, grayish substance, cells, blood vessels, and probably lymphatics. Little is known of these lymphatics, but this much is certain, that the number of lacteals which may be traced during digestion from the Peyerian patches is greater than that in other parts of the intestine. This description of the patches of Peyer is quite fitting also to all those vessels of a peculiar kind, termed solitary glands, found scattered singly or in groups over the wall of the large and small intestine, of whose import, as yet, we have no clear understanding.

Of all the fluids brought in contact with the food, viz., bile, pancreatic juice, and intestinal juice, the latter is perhaps the hardest to study. It is compound, and not the product of a single variety of glands. It is secreted only in small quantity normally, except in response to the stimulus of the presence of food. It is viscid, colorless, or of a rose tint, and in reaction invariably alkaline. Opinions on the physiological action of the intestinal juice vary greatly, but it is generally agreed that, though it readily converts starch into sugar, it acts only as a valuable adjunct to other intestinal fluids, rather than as the digestive agent of any particular article of food.

The pancreatic juice is the product of the pancreas, a glandular organ, situated in the upper, posterior portion of the abdominal cavity. The gland weighs four or five ounces, and is about seven inches in length, an inch and a half in breadth, and three-quarters of an inch in thickness. As its secretion resembles saliva, it has been termed the abdominal salivary gland. It is emptied by one or two ducts into the duodenum, a little below its middle. Pancreatic juice is viscid opaline, and has a distinctly alkaline reaction, with a specific gravity of 1040. Pancreatine is the essential physiological ingredient, and gives to this fluid its peculiar digestive power. The quantity secreted in twenty-four hours has never been accurately estimated. This fluid exerts an important influence on nearly all food, but especially upon fats, which it digests by effecting their minute subdivision in the form of an emulsion.

The bile has no marked influence upon any special class of food, but undoubtedly aids the digestive process. It is secreted by the liver, and poured into the upper portion of the small intestine in connection with the pancreatic juice. It is of a brownish hue, and has a specific gravity

of 1018, with an alkaline reaction. From the fact that bile will produce energetic spasms of both the voluntary and involuntary muscles, when applied to their tissue itself, or to the nerves supplying them, it seems proper to infer that its importance in maintaining the peristaltic action of the intestine is considerable. Its presence in the intestine seems also to promote the secreting action of the intestinal glands.

By the contraction of the muscular coat of the small intestine the contents are made to pass along the canal. The gases which are constantly found in the intestine have also an important mechanical function. They help to keep the canal distended, thus preventing injury by concussion in walking and leaping.

The nerves which supply the small intestine are derived from the sympathetic system and from branches of the right pneumo-gastric.

To thoroughly understand the nature of intestinal digestion there must be a very distinct knowledge of what is accomplished by the preceding organs—mouth and stomach. Our food is principally composed of starch, albuminoids and fats. The starch is acted upon by the saliva, converted into sugar, and as soluble sugar in the stomach is absorbed into the blood by its mucous membrane, so does not interfere with the digestion of albuminoids going on therein. This diastatic action can only go on in an alkaline or neutral medium. The acid of the stomach, therefore, arrests the digestion of starch, and any left over from the salivary digestion is not in any way finished, or even affected by the stomach digestion, but passes on with the other matter until it reaches the small intestine. Here all is mixed with the alkaline bile, which arrests the action of the acid gastric juice, and the digestion of starch is resumed under the influence of the pancreatic secretion, and the soluble sugar produced is passed into the blood of the portal vein.

The healthy use of the teeth is no doubt a prominent factor in their preservation. "Hard tack" was hard fare for our soldiers, and at first seemed to loosen every tooth in the head, but the necessity of the chewing soon gave firmness to the teeth and a healthy flow of blood to all their surrounding tissues. The clammy coating to the teeth of some who live on soft food would be entirely removed by the vigorous chewing good sensible hard fare would necessitate.

The want of space between teeth, we are confident, is one of the most prominent causes of their decay. Few teeth decay on their proximal surfaces where there is a free space between them. The best way of treating incipient caries on such surfaces is by making a distinct separation from the inside with a V-shaped instrument, and thus obliterating the superficial cavities. By leaving a clear space for the circulation of saliva, and preventing the lodgment of food, further decay is unusual.

THE ESSENTIAL OILS.

BY A. P. PENROSE.

Of special interest to the dentist are the ESSENTIAL OILS. These oils have a strong odor, similar to the plants from which they are obtained, but generally less agreeable. When exposed to the air they have the property of absorbing oxygen, becoming less odorous, thicker and deeper in color, and are ultimately converted into rosin. Light has a great influence in accelerating this process. They consist mainly of carbon and hydrogen, and many also contain oxidized bodies formed from the hydrocarbons by the action of atmospheric oxygen and moisture. According to Kingzett, this oxygen forms an organic oxide, which he calls camphoric peroxide, which gives up its oxygen in the form of peroxide of hydrogen. The great value of the Eucalyptus tree as a purifier of malarious districts is in great measure due to its essential oil, and its property of oxidizing or destroying these malarious germs, although its beneficial action upon marshy places is no doubt due partly to the fact of its being a tree of very rapid growth, and, consequently, absorbing a large quantity of water.

The preparation called SANITAS consists of Oil of Turpentine oxidized by being subjected, while floating on water, to a heated current of air. It has valuable antiseptic properties, and as a general disinfectant has the very great advantage of being non-poisonous; its valuable properties being due to the large quantity of camphoraceous compounds it contains, and its power of giving off peroxide of hydrogen.

We must here notice two valuable antiseptics, MENTHOL and THYMOL. The first is the camphor, or stearoptine of Japanese Oil of Peppermint, and is obtained from it by long keeping or exposure to cold. It is said that a solution of 1 to 100 possesses the power of a solution of carbolic acid twice the strength. I should very much like to know if any gentleman has tried this as a dressing for offensive pulp canals, and with what results. From its properties one might hope for a successful result, if it is not too irritating. Thymol has very similar properties to Menthol, but hardly so strong, though it is said to have a greater power in arresting fermentation than either carbolic or salicylic acids.

Oil of Cloves, so often used as a dressing, is said to contain a small quantity of Salicylic Acid, and to this its antiseptic properties are probably in some measure due, for it seems to be weaker in camphoraceous compounds than many other of the essential oils.

Many of us are very fond of using a mixture of IODOFORM and EUCALYPTUS OIL, and it is doubtful whether we could find a better, as both have strongly antiseptic properties, the Iodoform also having an absorbent action.

ANTISEPTICS.

BY ARTHUR P. PENROSE, L.D.S.

By an antiseptic is generally understood some agent opposed to putrefaction, and a distinction is often drawn between an antiseptic and a disinfectant; but the two properties are so often combined in the same body, and the disinfectant action is so dependent upon the antiseptic that it is useless to attempt to draw any broad line of distinction between them. Though there are many substances, such as glycerine, with undoubted antiseptic properties, yet the form in which they exist, or in which we can keep them, is opposed to their use as disinfectants.

The first antiseptic to which I shall call your attention is the ATMOSPHERE, and on so vast a scale are its properties being continually exercised that we are wont to forget them from their very magnitude. Its principal uses are to oxidize and remove contaminating matters. Those fierce gales so much dreaded are to the inhabitants of our great cities the best of friends; one strong gust of wind is, by the removal of vitiated and stagnant air, and supplying its place with a fresh quantity of oxygen, doing us more good than any imaginable quantity of our known antiseptics could effect in so short a time. It is moving air that is so valuable; still air, particularly if moist, favoring decomposition and disease. It is a matter of history that before the great Plague of London an unusual calm prevailed. Dead bodies placed in a current of dry air have, though dried up, been preserved for ages without decomposition. It is strange that, so well acquainted as we are at the present day with the value of fresh air as a supporter of health, that it was not until the last century that any attempt was made to obtain and preserve it in houses by ventilation. In the year 1723 an attempt was made to ventilate the House of Commons by means of a "blowing-wheel," which acted like a fan, and though many improvements have been made since that time, I fear that we are still, even with our nineteenth-century civilization, only on the threshold of a knowledge of perfect ventilation.

Water, by the simple act of washing, acts as a great disinfectant. Every shower of rain washes down impurities and organic germs out of the atmosphere, and rivers act in a similar way by carrying decomposable substances down to the sea, where they are dispersed abroad and oxidized by being dashed about in the air as waves and spray. In the same way does it act upon our own bodies, and its cleansing and refreshing influence is now generally appreciated. This was not forgotten in the Mosaic law, which required the washing of clothes and keeping apart for a certain length of time of the person who had touched a dead body, or was otherwise infected. But water, like air, to act

as a disinfectant, must be kept in motion—still water soon becomes stagnant, and encourages putrefaction. Both water and air are assisted greatly in their disinfectant actions by the soil, which oxidizes the various decomposing substances carried into it, the nitrogenous bodies being oxidized into nitrates.

Cold is a great antiseptic and disinfectant, but from its unmanageable nature can seldom be utilized. By means of intense cold meat can be preserved sweet and good for food for a great length of time, and it is a means now largely employed in supplying our markets with fresh meat from various sections very far apart. It is also well known that cold weather has a great influence in checking the spread of infectious diseases. Chemical action is excited by heat and retarded by cold. A certain amount of heat also has some antiseptic influence both by drying and altering the chemical state of substances. Albumen coagulates at 140° Fahr., and does not decompose so readily above this temperature, and it is when bodies have reached this stage that we call them cooked. The Trichina, or Pork insect, found in Germany, is vitally destroyed by cooking.

Light also greatly assists fresh air and water in their antiseptic properties, although its precise action is but little understood; it is, however, a patent fact that neither animals nor vegetables thrive without it.

Smoke from burning wood has antiseptic properties, and it is frequently used for the preservation of meat and fish, its action being partly due to a small quantity of Pyroligneous acid which it contains.

We now pass from these great natural antiseptics to the artificial.

These substances are very numerous. The first that claims our notice is CARBOLIC ACID. Carbolic Acid was discovered in coal tar by Runge, in 1834, who gave it the name of Carbolic Acid. Being chemically a Hydrate of Phenyl it is more correctly described as Phenic Acid, but out of consideration for the original discoverer, the name he gave it is generally used. It has chemically very slight acid properties, and does not redden litmus, being more allied to the alcohols than the acids. But it is its medical properties, rather than its chemical composition, which most interests us. In solution it coagulates albumen, arrests fermentation, instantly destroys the lower forms of animal and vegetable life, and in very small proportion prevents mouldiness in vegetable juices.

Carbolic Acid seems to act as an antiseptic, solely by coagulating Albumen. It does not preserve by absorbing and retaining moisture, like Chloride of Sodium, Alcohol, etc., as, practically, it has no affinity for water.

The next substance we must glance at is SALICYLIC ACID. This is prepared by passing Carbolic Acid into a mixture of Carbolic Acid and Caustic Soda, and decomposing the resulting Salicylate of Soda with

Hydrochloric Acid. Stocken says "it is a powerful antiseptic and disinfectant, said to be three times more effectual in preventing fermentation than Carbolic Acid;" and Thiersch also says "that a saturated solution prevents putrefaction of the blood and secretions of a wound, while it produces no irritating effect upon recent or granulating wounds."

Boracic Acid made from Borax also has antiseptic properties; these were discovered by a person named Gahn, who made and sold two mixtures which he called respectively "Aseptine" and "Double Aseptine," the first consisting of equal proportions of Boracic Acid and alum, and the second of one part of Boracic Acid and two of alum. The addition of the alum prevents the formation of a black crust, which otherwise forms over provisions preserved only by Boracic Acid.

We will now pass on to consider SULPHUROUS ACID, made from burning sulphur, which has strongly antiseptic and disinfecting properties, being especially fatal to the lower forms of animal and vegetable life. It is supposed to destroy them by its anti-oxygenizing influence, that is to say, that it suffocates them by preventing their receiving the necessary amount of oxygen; but it probably has both a physiological as well as a chemical action. In the *Medical Times ano Gazette*, of June 7, 1879, Dr. Mehlhausen refers to the disinfection of rooms in which infectious cases have been kept. The result arrived at is that the most energetic and cheapest disinfectant is Sulphurous Acid. Twenty grams. of sulphur per cubic metre of space destroy, when burnt in a closed room, all bacterial life in sixteen hours. It is advisable to damp the floor before lighting the sulphur, so as to profit by the great solubility of Sulphurous Acid in water.

A solution of Sulphurous Acid is a useful wash for the mouth in certain fungoid growths.

A solution of Permanganate of Potash, is a very common but serviceable antiseptic. It has a wonderful power of destroying fetid odors from organic sources, and, it is thought, can prevent the spread of infectious diseases by destroying poisonous emanations. Stocken thus speaks of it—"It readily yields its oxygen to bodies having an affinity for that element; hence its great value as a deodorizer; yet, while it destroys the odor of putrefactive substances, bacteria not only retain their activity, but appear to grow and flourish." It is, however, of great service to the dentist as a wash for foul mouths. Its almost complete absence of smell, and having a very slight taste, render it invaluable in many cases.

Astringents are said to have antiseptic action, by drawing the particles of matter together, and thus checking their decomposition or separation. In this way Tannin appears to act; it combines with the putrescible albuminoids, forming imputrescible compounds, of which leather is a good example.

TREATMENT OF THE DENTAL PULP.

BY DR. WM. H. TRUEMAN, OF PHILADELPHIA.

Our success or failure in the conservative treatment of the dental pulp depends, and must depend, not only on the method adopted, and the delicacy and skill of the operator, but also on the physical condition of the patient immediately before and for some time after the operation is performed.

There are patients for whom it is impossible to save a tooth after decay has encroached upon the pulp, no matter what plan is adopted, or how carefully it is treated. There are persons so constituted, or at certain times in such a physical condition, that the most serious results will follow the slightest injury, even though they are in apparent robust health. I recollect an instance of a merchant in Philadelphia, apparently in perfect health, while seated at his desk, twitched a small hair from his nostril, a thing we all have done probably many times without injury, but in his case this insignificant injury was followed by erysipelas, and in less than two weeks he was dead.

We must not forget that the result of our best-laid plans depends on Madam Nature's veto or approval.

We have repeatedly excavated and filled comparatively superficial cavities, and have been sure there has been no pulp exposure, and yet, in perhaps two or three years, they have returned with abscess. On removing the filling, we found an opening connecting the cavity of decay with the pulp chamber—the result of retrograde nutrition. When a pulp has been exposed and capped, one of three things takes place:

First, it may be restored to health; second, it may die and give no trouble; third, it may die, and after a longer or shorter period, irritation may set in, followed by more or less serious results.

How can we diagnose the exact condition of the pulp? Between a vital and a dead discolored tooth, there is a wide difference; but there are cases where these conditions approach each other so closely we can scarcely distinguish them. A vital pulp may naturally possess so little sensitiveness that our most approved tests may lead us to suspect its death, especially if the natural translucency of the tooth has been impaired by a large filling. And again, an absolutely dead pulp, through the sensitiveness of the surrounding tissues, and its connection with the live portion of nerve beyond the apex of the tooth, may respond to the same tests in such a way, that we are led to conclude it is alive, especially if it is in a mummified condition, and affects but slightly the color of the tooth. Have we not all made mistakes in just such conditions as these? If it is difficult to diagnose with certainty between life and death of the pulp, how much more difficult is it to say how far the

pathological changes in the pulp have progressed, and how far the physical condition of the patient will allow them to progress without insuring a fatal result?

Not only do we labor under this difficulty of correctly diagnosing the exact condition of the pulp, but we are equally at fault in following the result of our treatment. The absence of pain may indicate either death, or a return to a healthy condition, or it may mean only a cessation of active irritation; a partial return to the normal state, to be followed by a slow but sure loss of vitality and final death. The position and surroundings of the pulp are so peculiar, that the theories and practice of general surgery are of but little use in its treatment.

The first result of irritation is an increased irritation by the pressure of the engorged vessels on the delicate nerve fibres, and the same congestion lessens the chance of recovery, by cutting off the circulation at the point where the vessels pass from the organ to the general system, at the apex of the root. The remedies usually relied upon to relieve this condition, can seldom be applied to this organ, imprisoned in its bony cell. We mainly depend on their reaching it by absorption, or by the effect they may have on the surrounding tissues.

The ability of this organ to bear injury, varies to a great degree. I have had several instances where I had removed superficial decay from incisor teeth, not taking off more than half or two-thirds the thickness of the enamel, and in from one to three years, have found dead pulps —a careful examination failing to suggest any other cause than the irritation of the filling. On the other hand, a case came into my hands recently where Dr. James Truman made three applications of arsenic to an exposed pulp without the slightest effect, and then capped it with oxy-chloride of zinc. The filling inserted over it remained about three years, when it was dislodged by accident. I made three attempts to devitalize the same pulp, the last time pricked the arsenic into the point of exposure, and leaving a small quantity in contact with it a week without the slightest effect, and finally capped with oxy-chloride. The tooth is perfectly easy when filled, but very sensitive to contact, or heat or cold, when the cavity is open. We have here the two extremes, one case in which no attempt to cap would succeed, and another in which anything will answer.

I am inclined to think we often shout "Eureka!" too soon. In cases of failure it is usually from one to three years before the result is seen, probably in some cases much longer, on account of the oxy-chloride retarding decomposition, or the condition of the system tolerating the devitalized organ.

Taking all things together, it is generally a desirable operation. If it does succeed, we have gained something; while if it fails, it is a

question if the usefulness of the tooth is compromised any more than it would have been had arsenic been used at first.

Considering the different methods in use, we consider *that* the best that gives the greatest amount of protection with the least irritation; and, recognizing how greatly the result of an operation depends upon the peculiar manner and method of the operation, I consider that the choice of methods is a matter for individual judgment.—*Penn. Trans.*

CAPPING EXPOSED NERVES.

BY W. D. DUNLAP.

The present popular plan for capping exposed nerves seems to be wrong in theory, and the practice has been followed by such an amount of *seeming* success that theories have been framed to fit. I allude to capping with oxide of zinc and carbolic acid or creasote. The oxide of zinc is spoken of as a non-irritant. Is this established as a fact? I think not, and I think the same may be said of carbolic acid or creasote. Treatment of diseased conditions may (and do) indicate their use; but when the nerve has become healthy, its use should cease and a non-irritant covering placed upon the exposed nerve. Believing the practice in vogue to be wrong, I tried a putty made of the oxide of zinc and vaseline, but it always induced pain, that sometimes subsided very slowly. It needed the obtunding help of carbolic acid or creasote, to get along well at first. So we gave up the zinc; and now we make a putty of whiting and vaseline, and if conditions are not as favorable as we could wish, we work in a trace of oil of cloves, believing that the vaseline will mollify its irritating tendency. This putty does not seem to irritate the nerve at all, and if moisture is excluded for a day or two it becomes moderately solid, when the filling may be inserted, or, if desirable, a concave cap filled with the putty may be inserted and the tooth filled at once.

My experiments with vaseline in sensitive cavities warrant the suggestion that it is a valuable application. Dry the cavity well, and on the blade of the excavator carry enough to keep the part well lubricated. I have not tried it with burs enough to give results, but believe it will be found valuable in all such cases.

In excavating decay of the teeth, there need not be so much thoroughness in removing all the affected dentine in the vicinity of the pulp as near the border. All that is here soft, crumbly, or frail should be most thoroughly cut away; but for a covering of the pulp there can be no better material than the dentine itself, though it be quite soft. It is made much better, however, by my tanning process.

THERAPEUTICAL TREATMENT OF EXPOSED PULPS.

BY DR. LEWIS JACK, PHILADELPHIA.

It may be defined that application of remedies of such dilution or of such qualities as to be non-irritating and possessing tonic or sedative powers, may be designated as therapeutic or healing to the pulp.

This class of remedies has been more used lately than formerly, and further experience promises to increase the number, and to enlarge the range of them. At present they are few, viz.: aconitum, calendula officinalis, camphora, hypophosphate of lime, lacto-phosphate of lime and Canada balsam. To these may be added thymol, and creasote or carbolic acid, always in solution. Frequent reports of successful treatment have been made of all these remedies; and it may be said a reaction has occurred towards reliance upon medicaments which do not excite irritation.

The accumulation of carefully recorded experience of conservative treatment of dental pulp, has not been sufficient to enable a clear view of the whole subject to be attained.

A mode of treatment which would be applicable to one class of cases, and which will be followed by satisfactory results, may be utterly useless in another class; a distinction, the force of which an attempt will be made to illustrate in what shall follow.

It appears from the different discussions which have taken place on this subject, that some who do not hesitate to treat all simple non-painful cases of exposure, have no confidence in similar treatment in cases which have been attended by severe symptoms. Others attempt treatment in all cases. It will readily be seen that the proportion of success to failure by the former, will be greater than obtains in the practice of the latter.

It may, however, be stated as a safe deduction from the concurrent experiences of a great many operators, that the treatment of the pulp is often followed by satisfactory reparations, and that it is desirable to extend a knowledge of the means of securing so beneficial an end. It is certainly not too much to expect, that at length the treatment of the denuded pulp will be as reliable as any class of operations in our specialty of surgery. Towards these purposes I shall now direct attention to the plan of treatment I have been practicing, believing that some of the features are of a valuable character.

The cases of disturbance of the pulp are properly divisible into the following classes:

Conditions depending upon the very close proximity of caries.

Accidental encroachments upon the pulp by cutting through the healthy dentine.

Conditions induced by the actual contact of caries at a small part;

the pulp remaining covered by the gelatinous residue, and not previously the source of pain.

Conditions caused by the complete exposure to external irritants, as air, food, pressure, etc., and which have produced odontalgia.

Any extended description of these conditions it is unnecessary to make, and your attention can be more profitably occupied by the consideration of the treatment I have found most serviceable at my hands in each of the described conditions.

The treatment of cases of proximate exposure has been attracting much attention for several years, and deservedly so, for it may now be justly said that there are more deaths of the pulp from the failure to recognize proximate exposures, and from disregard of the simple treatment required to preserve the pulp in these cases, than follow skillful conservative treatment of full exposures. The only safe plan to pursue in cavities at all near the pulp, and in all moderately deep cases of caries in the lateral incisors, central incisors and bicuspids, is to apply a small quantity of carbolic acid to the cavity, and then on the portion over the pulp, some non-conductor should be laid. In the small teeth above mentioned, my practice is to touch the part nearest the pulp with a solution of *gum mastic*, in either alcohol or ether, and in a moment the surface is perfectly protected.

In deeper cases I lay upon the mastic before it has hardened, a thin shaving of hard gutta percha. In the deepest cases I cover thickly the bottom of the cavity with either mastic or a solution of gutta percha in chloroform, and fill the deeper half of the cavity with oxy-chloride of zinc as a mechanical foundation.

It may be said here that in the treatment of these, and of all pulp cases, it is indispensable to success that the rubber dam be applied to effect complete control of moisture.—*Penn. Trans.*

NO TEETH NOR HAIR.

We have a queer specimen of humanity in this vicinity. Though the subject is forty years old he has never had either teeth or hair. Even the scalp is simply covered with a light down, as in early infancy. His skin is almost destitute of sweat glands, so that he never perspires. When at work in hot weather, he has to have water sprinkled or poured upon him. He sleeps better on the cold, wet ground. He is destitute of the sense of smell, and almost of taste. His maternal grandmother and uncle were similarly defective. This man was the youngest of twenty-one children.

Though unable to chew his food, he has never had dyspepsia, and has generally enjoyed good health. He is the father of eight children; two of them (girls) have less than the usual number of teeth.

ON THE FUNCTIONS OF THE NERVES OF TASTE.

BY A. UNDERWOOD.

For a long time the almost universally acknowledged view of physiologists was that the sense of taste was conveyed to the cerebrum by the agency of two nerves—the glossopharyngeal and the lingual branch of the 5th pair—the former presiding over taste at the root of the tongue, the latter at the tip and sides. This opinion was supported by the apparently conclusive evidence that section of either nerve produced loss of taste in the region it supplied.

The actual result of the experiment was true. The deductions of the experimenters, as is often the case, have been since shown to be mistaken as far as the lingual was concerned. Since the question first became a matter of dispute the controversy has led to many and various opinions being alternately entertained, and then, as evidence accumulated, abandoned. I do not think there is perfect unanimity upon the subject yet, but there is at least a growing inclination to adopt one view among a large section of physiologists.

Whether it is a special sense of the same order as the sense of sight, or hearing, or smell?

Whether much of it may not be due to the assistance of the sense of smell? Every one knows how greatly a cold and the subsequent blocking up of the schneiderian membrane and suspension of the sense of smell affect the kindred sense of taste. We all remember the time-honored practice of holding the nose while taking medicine, and can all speak warmly to the advantages derived from the partial suspension of the sense of taste thereby. Moreover, most substances that excite taste excite smell also, and in most cases the taste very much resembles the smell.

That these facts indicate a close relation between the two senses is clear, but to argue from them that taste does not exist by itself (as has been done) is, I think, straining a point.

The sense of taste is certainly not so specialized—so thoroughly different from common sensation—as sight or hearing, but I think the difference is due, not to the nature of the nervous fibres, but to the degree of elaborateness in the end organ by which the sensations are transmitted to the nerve.

At one time in intra-uterine life all nervous elements were very similar. Michael Foster has beautifully described the simplest nerve as being "a strand of highly irritable protoplasm, stretching from one cell to another." All these strands and their cells were equally susceptible to waves of light or waves of sound, or the sense of touch. Presently various bundles begin to adapt themselves for their special mission, much as medical students, after their general medical educa-

tion, begin to study specialties, and, forgetting much of the little they ever knew of the other branches of the great profession, devote themselves to become specially skilled and adapted for the special branch that is to be their adult pursuit. In both cases some become more specialized, some remain somewhat generalized, and curiously enough the senses in which the nerves become most specialized are notable fields of specialty for the surgeons—the eye, the ear, and the mouth.

LOCAL ANÆSTHESIA.

By the following method abscesses, felons, boils, etc., can be opened with little or no pain:

Sharpen to a point a stick about six inches in length. Dip the point into liquified carbolic acid, and apply to the point chosen for opening. After a moment's delay cut the skin with a knife; then take a little of the acid on the point of the stick and apply in the incision with a gentle rotary motion. By frequent applications of the acid, and a gentle rotary motion of the stick persistently applied, an opening can be made to the required depth. The carbolic acid produces first anæsthesia, then death of the parts to which it is applied in the foregoing manner.

I have little doubt but, by patience and perseverance, a stick might be made to pass, without pain, through the entire thickness of the fleshy part of the thigh. The following are cases to the point:

Mr. J. G., a young man aged about twenty-two years, had passed several sleepless nights, and had suffered great pain with a deep palmar abscess. He presented himself to me with a worn and haggard expression of countenance, and with his nervous system unstrung. In a few minutes I succeeded in making a free opening, causing little or no pain, through which pus escaped. A rough measurement showed an aperture through the swollen tissues seven-eighths of an inch in depth.

Miss S. S. presented herself to me, under nearly the same circumstances and conditions as in the preceding case, except with felon on her left thumb. A few moments' manipulation relieved her without pain, and left a free opening, through which pus freely escaped. The depth of the opening was a scant three-fourths of an inch.—*Southern Practitioner.*

A WRITER in the *Medical Times* declares that alcoholism is unknown in Brazil, and the cause is coffee. Cafes in which the most delicious infusions of the bean are dispensed, abound there, where saloons for malt and spirituous beverages abound here. His Excellency, the Baron of Theresopolis, Vice-Director of the faculty of medicine of Rio de Janeiro, proclaims that the number of drunkards in a country is in inverse ratio to the amount of coffee consumed.—*Medical Age.*

CARBOLIC ACID AND CREASOTE.

BY DR. T. W. BROPHY, CHICAGO, ILL.

There is much in the literature of dentistry on the use of carbolic acid and creasote; there seems to be an almost universal preference shown for the latter. Carbolic acid has entirely superseded creasote as a remedy in general medicine and surgery, and I believe there is no sufficient reason for placing it second to creasote in dental therapeutics. Why creasote is preferred to carbolic acid by dentists, is indeed difficult to understand. A disposition on the part of members of the profession, however, to accept the methods of their predecessors, may be an explanation of the views held by so many in regard to these agents. Carbolic acid is equal and perhaps superior to creasote, as a therapeutical agent; its action is identical to that of creasote when of the same strength, and their strength is determined by their power to coagulate albumen. Of twenty-five scruples of creasote purchased from as many dealers, including dealers in dental goods, I find on examination that all, with one exception, contains carbolic acid. Some indeed are pure carbolic acid—the one which is free from carbolic acid was imported and sold to me by Gold & Blocki, of Chicago. Those, therefore, who have supposed they were using creasote have employed either carbolic acid or a mixture of this acid with creasote. Carbolic acid is soluble in water only in proportion to ninety-five per cent of carbolic acid to five per cent of water, and in any proportions stronger than that; also in the proportion of ninety-five per cent of water and five per cent of carbolic acid or any solutions weaker than that. It is impossible to dissolve carbolic acid in water alone, in any other proportions than the above. If, however, we add glycerine or alcohol to the water we may make it of any strength desired. We hear of ten per cent solutions of carbolic acid and water—this is an impossibility.

Is carbolic acid, or creasote, when applied to exposed pulps, calculated to restore them to a *normal condition?* Let us see. In the first place it is essential to know the action of this agent when locally applied. Carbolic acid coagulates albumen, and dissolves into volatile and fixed oils. It is an escharotic, leaving a white eschar which soon turns brown and is cast off. Carbolic acid is an anæsthetic, acting with wonderful promptness upon the part to which it is applied.

Dr. J. H. Bill states in an article published in the "American Journal of Medical Science," that "by applying carbolic acid to the integument, insensibility to pain may be sufficiently induced to permit free incisions without suffering." The escharotic action of carbolic acid contraindicates its use as an application to exposed pulps, the vitality of which we endeavor to preserve. If, however, we make

solution of from one to five per cent, we have an excellent remedy, slightly stimulating and antiseptic, which may be applied to an exposed pulp without fear of causing a slough and subsequent death of the whole part. I regard it bad practice to apply an escharotic to a pulp, the vitality of which may be preserved by proper treatment. Carbolic acid or creasote, therefore, if used in contact with exposed pulps, which we subsequently cap, must not be stronger than a five per cent solution. Carbolic acid has been very successfully used to arrest nausea and vomiting. From one to two drops in a glass of water will usually accomplish the result desired.

Since carbolic acid has the power to arrest suppuration, and to promote healthy granulations, it is invaluable in the treatment of alveolar abcesses, apthæ, ulitis, stomatitis, phagedæna, papilloma, epithelioma, schirrous, cauliflower growths, etc. In the treatment of the above diseases, the agent should be of such strength as the requirements of the case indicate.

Carbolic acid *is a powerful* antiseptic, but *is not*, as many well-informed members of the profession believe, a disinfectant. Carbolic acid *has* the power of preventing decomposition (hence *it is* an antiseptic), but *has not* the power to destroy or render inoffensive the products of decomposition; therefore it *is not* a disinfectant.

Owing to the erroneous impression as to the properties of carbolic acid, it is used to the detriment of patient and practitioner in the treatment of many lesions. Carbolic acid is an irritant poison. Although an escharotic, it diffuses into the blood rapidly. If carbolic acid has been taken in toxic doses, liquor calcis saccharotus or oil is the antidote. When it is found necessary to devitalize a pulp, the anæsthetizing properties of undiluted carbolic acid make it desirable as a dressing previous to the application of arsenious acid. There are other remedies, however, equally as efficient. Carbolic acid is the most satisfactory agent to obtund sensitive dentine without endangering the vitality of the pulp, with which I am acquainted. Carbolic acid may very properly be applied to the canals of teeth immediately after extirpating their pulps, but if the pulp is putrescent it is not to be used; since some form of chlorine is the agent indicated with which to disinfect the parts.

Carbolic acid as well as creasote, are flesh preservers; indeed, the word creasote is derived from two Greek words, *Creas*, flesh, and *Sotal*, I preserve—flesh preserver. It preserves flesh, however, not as is frequently supposed, to wit: by preventing vital soft parts from losing their vitality, but by preventing non-vital tissue from becoming putrid and disintegrating. Carbolic acid is a most excellent remedy to apply to carious teeth during the process of excavating, to enable us to more clearly see the extent of the caries. In many cases where we have ad-

justed the rubber cloth and excavated the cavity in the most skillful manner, we are surprised, upon moistening the cavity and its surrounding surfaces with carbolic acid, to find carious tissues, which if permitted to remain, would soon render another operation necessary, in order to arrest the progress of disease. If a few drops of carbolic acid be added to sandarac varnish, which we use for moistening cotton to be used for temporarily sealing cavities, it will prevent decomposition of the secretions which accumulate about the cavity and the cotton will remain free from offensive odors much longer than it otherwise would. Carbolic acid is most destructive to the lower forms of life. These minute organisms, so frequently found in the oral cavity and in carious teeth, cease to exist when very dilute solutions of this agent are brought into contact with them ! "As all fermentations are co-relative of the growth and multiplication of these minute bodies, carbolic acid, by destroying their activity, arrests zymosis." A solution, one per cent in strength, according to Dr. Isador Neumann, is sufficient to destroy bacteria, vibrio, etc. I hope there may be untiring research without prejudice, by the members of our profession, as to the action of remedies, so that we may soon say that empiricism has yielded to the higher, more reliable and satisfactory methods, based upon the grand, broad, beautiful and universal truths revealed to us through the instrumentality of science.

ED. ITEMS :—While interesting myself in your mode of treating exposed tooth pulps, as advocated in January and April ITEMS, my attention was called to an article by Dr. Barrett, entitled "Some Facts in Dental Materia Medica and Therapeutics." Speaking of carbolic acid, he says : "Carbolic acid is a local irritant, and when applied to soft tissues forms a white eschar, which is only removed by the usual process of sloughing. When, therefore, this delicate tooth pulp, in cases of simple exposure, is seared with, and a cap of any material is placed over it, there is in contact with the living tissue a scab of disintegrated material which the tooth has no means of eliminating. The very process of thus cauterizing a part of the tooth pulp irritates the remainder and induces an angry condition, which the judicious operator would avoid."

The practitioner with years of experience, will pursue the even tenor of his ways unmindful of the diversity of opinion in the application of the various medicaments employed by the profession ; his judgment enabling him to choose that which will the most successfully accomplish the ends in view, when the student, or young operator, would be at sea.

Hoping to hear from you further on the subject, through the ITEMS, for the benefit of the young men who have not attained to these years of experience, I remain, with best wishes for your continued prosperity,

XX.

WHAT RETAINS A PLATE OF TEETH IN THE MOUTH?

BY W. A. HUNT, L.R.C.P., LONDON.

If two pieces of plate glass with parallel faces be placed in a shallow vessel containing ink, with two of their vertical edges in contact, and slightly separated at the opposite edges, the ink will rise by capillary attraction between the glass plates, the height of the column being inversely as its distance from the angle of contact between the plates. The cause of the rise of the liquid is the adhesion between its particles and those of the glass; the limits to the rise are the action of gravity and the force of cohesion among the liquid particles.

The retaining power of capillary attraction is, therefore, in inverse ratio to the distance between the plate surface and the living surface.

Liquids rise in vertical fine glass tubes in spite of gravity, but all liquids do not rise to the same height in glass tubes of equal diameters; but a relation is observed between the specific gravity and the height. Thus, water as unity or 1, will rise .604 inch, while ether, of which the specific gravity is .737, will rise but .213 inch, or one-third the height of water. So in the mouth, if the living surface is covered with thick mucus, capillary attraction is much stronger than that where only a watery saliva connects plate and living surface.

One is accustomed to regard a vacuum as an empty space, such as nature abhors, and into which air will at once rush until equilibrium is established. In a plate that fits well at every point, where, I ask, is the vacuum? And if no vacuum, what becomes of the theory of atmospheric pressure? This capillary attraction, I conceive, holds the plate in position when everything is in a state of rest. But we are far more concerned to retain the plate in position during the acts of mastication, speech, etc., and here the atmosphere comes to our assistance. Any movement of the plate produced by muscular action, slightly draws the plate from the living surface, diminishing capillary attraction and forming a vacuum; the edges of the plate fit well against the soft parts and prevent air entering anywhere, and atmospheric pressure quickly drives the plate again into close juxtaposition with the living surface, and capillary attraction is again established. Such is my theory, and therefore I maintain that Koecker was right, so long ago as 1835, in putting capillary attraction first, and atmospheric pressure second, among the causes for the retention of what are called suction plates.

The Rapidity in the Growth of Corals is seen in the fact that a young fungia adhering to the sheathing of a steamer which had rubbed against a reef, grew in nine weeks to a diameter of nine inches, which weighed two and a half pounds.

THE SICKNESS DURING TEETHING.

BY W. C. BARRETT, D.D.S.

The idea so very frequently expressed in all the medical works that the eruption of the teeth, during the period of dentition, causes such irritation and derangement of the whole digestive system, is, I think, an erroneous one. In health the eruption of the teeth is a perfectly physiological process. It should no more affect the general condition of the system than the growing of one's hair or finger nails. It is entirely physiological. Why is it then that people are particularly liable to stomach diseases just at that time? Because it is between hay and grass with the child, to use a common expression. It is just at the time when the digestive organs are undergoing a change from that simple diet and pabulum for which they were adapted in the first place, to a grosser, heavier diet. During this change children are peculiarly liable to stomatitis and difficulties of that kind. This is not caused by the eruption of the teeth. It comes from mal-nutrition, indigestion, or something of that kind. The irritation caused by the eruption of the teeth has nothing more to do with it than the growing of the hair upon one's head. I believe that there is a hundred times more injury done by the cutting of the gums than by leaving them alone. If the child is in anything like a healthy state there is no trouble about his teething. When there is sufficient pressure upon the gums there will be absorption of the gums, and the tooth will come through easily. In cutting the gums, nineteen times out of twenty, and I don't know but oftener, it is done at the wrong time and a cicatricial tissue is formed which only increases the difficulty in the eruption of the teeth. If I ever did cut the gums at all, I should slip the point of a pen-knife under the gums and cut upwards and outwards. I have seen children that were extremely ill, nearly in convulsions. I remember one particular case where I felt very confident that the cutting of the gums would relieve the difficulty, because of the extreme tension existing in the gums. I had read so much about the pressure producing convulsions. So I cut the gums, but it did not do any good. It was simply a case of stomatitis, indigestion or gastritis. The cutting of the gums was not of the slightest benefit to the child.—*Trans. Mich. Den. So.*

It is not enough to urge and entreat, to threaten and coax, to compel and to persuade men and women to do one thing and avoid another. We must, rather, open up to their minds the reason why one thing is right and another wrong; we must teach them the laws of life and the principles that underlie human action, and thus lead them to a living conviction of duty which will be vastly superior, as an authority in their lives, to any dictum of others.

DEAD PULPS MAY PRODUCE BLINDNESS.

These dead pulps once nearly prevented my being a dentist at all. When I was about twenty years old, and had been studying three or four years, I was told by an oculist that I would certainly lose the sight in my left eye, as the optic nerve was becoming paralyzed; and that, in all probability, through sympathy, the sight of my right eye would follow. I was told to go home and grow blind. I went home to grow blind. A dentist of great celebrity had, about two years before, wedged some of my teeth in order to fill them. The irritation thus produced had killed the pulps in the two laterals. Now, after I had gone home to grow blind, an abscess came on one of these teeth. I had it extracted, and in about three weeks my eye was well. I cried, "Eureka!" I had made a discovery. I said, extraction will cure these evils of bad sight, neuralgias, etc., for they proceed from nerve-irritation. We knew little about pulp treatment in those days, and I practiced for others what had been performed for myself. But after a time I became aware that it was not the dead *teeth*, but the dead *pulps* in the teeth, that caused the trouble. And now I do not lose any teeth from that cause. I save the worst old ulcerated roots.—*Clowes.*

A POWERFUL ANTISEPTIC.

The President of the Pharmaceutical Society of Liverpool exhibited last week a sample of eugenol, which had been placed in his hands on the previous day. He said it had recently been noticed as a very energetic antiseptic, and it was also said to be a remedy for toothache. Both these properties could be readily understood, as oil of cloves, from which it was obtained, as well as oil of peppermint, had long been used to prevent ink, starch, paste, etc., from becoming mouldy. The oils had also been long regarded as remedies for toothache. It was also known as eugenic or carpophyllic acid, having a formula $C_{10} H_{12} O_2$ and forming salts with bases.—*The British Medical Journal.*

An accurate impression for an artificial set of teeth is by no means an accurate representation of the surface of the mouth. Especially is this the case where the roof of the mouth is "hard and skinny" in some parts and "soft and flabby" in other parts. The "accurate plaster impression," as it comes from the mouth, must be made much more accurate for the purpose of good suction by "doctoring it up." Those parts representing the hard parts must be shaved, and those representing the soft must be patched. The strength of the suction of the plate will very much depend upon the good judgment of this operation.

OXY-PHOSPHATE OF ZINC.

BY E. G. BETTY, D.D.S.

One of the most useful materials in the daily practice of the operator is the oxy-phosphate of zinc. So useful and reliable is it, that it has quickly superseded the oxy-chloride, formerly so greatly in demand to meet the requirements of just such an article. As the material is comparatively new, and its manipulation somewhat different from that of the chloride, it may not be out of place to hazard a few suggestions in regard to its manipulation and uses. The properties depend, of course, upon the chemical process that takes place when the powder, oxide of zinc, and the solution of phosphorous acid, are mixed together. This change, whether it is solely chemical, or an obscure process of crystallization, or a combination of the two, one following the other, is beyond the province of this paper. That question is left for the chemist, who is welcome, at any time, to give us the result of his investigations. The intention is merely to outline the practical; that, to most operators, is, after all, of the most value. So far as the mixing of the oxy-phosphate is concerned, it may be laid down as a rule, that the powder is in all cases to be added to the solution. The required stiffness or flaccidity of the mixture is to be governed by the amount of powder added to the liquid. After repeated trials, and an aggravating experience, this method has been found to give the most satisfactory results. In very large cavities, not encroaching too near the pulp, when the intention is to fill with gold at the same sitting, it is desirable to guard against the shock of violent and sudden thermal changes. As a barrier between the metal and the dentine, it subserves a good purpose. Should the dentine be very sensitive, the oxy-phosphate is better made stiff and quickly pressed into place with a suitable burnisher. When mixed stiff the affinities of the base and the acid are so nearly or completely satisfied that there does not remain upon its surface sufficient acid to produce the sudden and acute pain that so many patients complain of. This pain, which so many operators make the ground of their objection to the use of the oxy-phosphate, is due to two different causes: First, when the material is made thin the acid predominates and immediately attacks the sensitive surface of the dentine in the cavity. Second, even though the phosphate be made stiff, it may at the same time be so far below the tooth in temperature that, when introduced, it will cause pain by immediately absorbing heat from the tooth. This is reasonable to suppose, because the cavity is dry and the filling is wet and of lower temperature. In the first instance the pain may be avoided, to a considerable degree, by previously lining the cavity with the dry powder. The thin mixture can then be poured in safely, the powder receiving and combining with the free

acid, thus protecting the dentine. Should the cavity be in the upper jaw, the thin mixture can, with little difficulty, be flowed in by first touching some interior point of the cavity with a small quantity of it. The bulk once touching this point of attraction, will readily flow into place. If made thin, the phosphate will necessarily require more time to set and become hard enough to withstand the percussion of the mallet. In the second case the materials ought to be prepared on a heated surface, to raise the temperature of the mass near that of the tooth. This is simply done by mixing it on the bottom of a tumbler previously containing hot water, or upon a square of glass or porcelain that has been warmed near the stove. The addition of heat to the mass, however, will hasten the setting, and it will be found necessary either to add less power to the liquid, or be very, very expeditious in introducing it into the tooth. A little close observation will enable the operator to determine just the required consistency, and the rapidity of crystallization when mixed warm. The adhesion of the mass to the instruments while handling it, is very annoying to those who are too lazy to slightly oil the instrument before using it. Instead of being an objection, this very adhesiveness is a desirable quality, and often serves us well when the cavity is of poor retaining shape, and we wish to fill temporarily. In such cases the adhesion will be found greatest when the mass is mixed thin. For capping an exposed pulp successfully there is probably nothing better than the oxy-phosphate, if it is properly handled. In the estimation of the writer, many failures are due to reckless excavation, and the consequent pain to which the pulp and surrounding dentine are subjected. The less pain attending the capping of the pulp, the greater will be the chances of ultimate success. After the excavation is completed the pulp can be covered with a thin skin of gum by flowing over it a little of the compound tincture of benzoin. The walls of the cavity may also be coated with it, a few moments only being required for the evaporation of the alcohol. It may be expedited with the warm air current, gently and gradually applied. The covering of gum may be thickened, if desirable, by two or three applications of the tincture at short intervals. A small quantity of the phosphate may now be mixed thin, on a warmed surface, and flowed directly over the exposure, allowing it to run over the edges so that it will bear upon the solid dentine. When hardened the capping may be trimmed with an excavator. The cavity can now with safety be filled as an ordinary one, without fear of producing pressure on the pulp. It is best to fill with a stiff mixture of the phosphate and allow it to remain for six months or a year, as the material is good for that length of time in the majority of mouths; longer in some. By proceeding in the manner above detailed, the operator will avoid producing that "shock" to the pulp that is caused either by placing in direct

contact with it an irritating acid, or suddenly reducing its temperature. If the pulp is outraged by careless handling and its sensibility subjected to a severe trial, we cannot hope for, much less expect, it to recover its wonted functions. It may not be generally known, but it is nevertheless a fact, that a violent toothache, due to an exposure, may be almost instantly controlled by an application of the compound tincture of benzoin. It was this fact that suggested to the writer the propriety of using it as a preliminary covering for the pulp; and experience has proved it very efficacious in many instances. It also serves very well when applied to the dentine over and around the pulp, during excavation, taking care not to flood the cavity with it while cold. The pledget of cotton saturated with it can be warmed over the lamp. The soothing effect of this tincture may be due, in some degree, to a slight anodyne property of some of its ingredients. It is probably more likely that its effect is owing to the evaporation of the alcohol, leaving a film of sticky gum that completely protects the surface from the atmosphere. Be that as it may, it is well worthy of a trial, and will not be found ungrateful.

The phosphate is a very good material with which to fill very sensitive teeth, when it is desirable to postpone, indefinitely, the introduction of a metallic filling. For this purpose it is much superior to the gutta percha fillings. After six months or a year, the greater portion of the phosphate can be removed and the metallic filling put in over the remainder. The sensitiveness will by this time have been greatly modified, or will have disappeared. A great deal can be said about this material and its many uses as a temporary filling for dead teeth, sensitive ones, exposed pulps, etc., with which the reader is familiar, making it superfluous to repeat.—*Ohio State Journal of Dental Science.*

Hardening Plaster.—Some time since we recommended a solution of alum for this purpose, and a dentist makes reply that it does not work. We should have stated that it requires *potash* alum; the ordinary ammonia alum will not do. They are both very cheap. The solution may be either added to the water in mixing, or the cast boiled in it. It becomes as hard as a stone. Where a very nice impression is desired, the latter mode is best, as, in adding to the mixture, the plaster sets so rapidly that it is difficult to take a sharp impression.

Ether as a Local Anæsthetic in Surgery.—To prevent the pain of minor surgical operations, such as lancing felons, boils, ingrown nails, etc., a simple process is the application of ether on cotton for a few minutes before the operation is performed. It is made much more efficient—in fact, almost painless—by forcing wind upon the ether to rapidly evaporate it, from a common bellows, or by other means.

ARTIFICIAL DENTURES.

BY DR. L. P. HASKELL, OF CHICAGO, IN ILLINOIS DENTAL SOCIETY.

I have found, from long experience, that it is better, as a rule, to insert the temporary set at once, say within forty-eight hours after the teeth are extracted. The gums prove less troublesome under a plate, and the patient is not subjected to the annoyance of being toothless for several weeks or months; and it is especially desirable, in case the front teeth or their remains are extracted at one time, as in that case the artificial teeth can be inserted in the sockets of the old teeth, producing, of course, a very natural expression. After a few months the necks of the teeth will be upon the surface of the gums still looking well. Patients will thus wear a set with comfort for a year, and I have known them to wear them for five.

For permanent sets, "Allen's Continuous Gum," when properly made, remains pre-eminently the *only* perfect method of inserting artificial teeth. Many have made a failure in its use from imperfect knowledge of constructing it, or from a slip-shod method of doing it. The artist realizes in its construction that a "thing of beauty is a joy forever."

Why are there so few good mechanical dentists—those capable of making anything, from rubber, up to a continuous gum set?

The first and principal reason is that the general use of vulcanized rubber has made it, to a great extent, unnecessary to know how to do any other kind of work; and as a secondary effect, instruction in other work has been very limited, so that that the dental student starts out from college, or his preceptor's office, with little preparation for the better class of work.

The remedy for this will be, first, more thorough instruction in college and in the dental office, in all kinds of metal work. In the second place, let there be more generally a *division of practice*, the student learning that branch for which he seems best adapted. If he *has not mechanical* genius, by all means let him follow some other avocation.

To make a Cheap and Serviceable Emery Wheel.—Turn wheels from well seasoned pine, of the form desired; place emery upon an iron plate heated to 200° to 212°; coat the wheels with glue prepared as for uniting wood, and roll the wheels in the warm emery. After the glue dries, the surplus emery is brushed off and another coating of glue is applied and the wheels are again rolled in the warm emery. The wheels should be allowed to become thoroughly dry before use. How can I make emery sticks? Prepare sticks of such forms as you may require, and coat them as directed for emery wheels, or attach to them emery paper by means of glue or paste.

SOME OF THE SOURCES OF ENCOURAGEMENT IN OUR WORK.

BY DR. C. A. BRACKETT, OF NEWPORT, R. I.

Let us mention some of the sources of encouragement and cheer in our work. Note, first, that however humble and disadvantageous the circumstances of our beginning are they should not be in the least disheartening, but rather the reverse. We may see daily, by reading the obituary columns of the press, that a very large proportion of those who have earned prominent and honored positions were strengthened and disciplined and developed by a hard struggle in the beginning. Biography repeats the same story over and over again in the lives of great men. Think of Demosthenes, of Columbus, of Milton, of Shakespeare, Bach, Arkwright, Watt, Stephenson, Johnson, Ferguson, Franklin, Morse, Burritt, Grant, Wilson, Lincoln, Garfield, and hundreds of others whom these may serve to suggest.

Let us appreciate, in the second place, the great blessing of that labor which aims to render the world useful, productive service.

The man whose whole soul is in his work may be cold, or wet, or dinnerless, or sleepless, and not know it The miseries are shut out by the pre-occupation. It is not in the nature of man to be idle without suffering ill consequences. The mill that has nothing to grind grinds itself.

The spirit of doing our work at our best, whatever it is, is also a most helpful and cheering one for ourselves. Said a gentleman who was, by the proprietor, being shown through works that had gained a high and extended reputation for the production of hammers of superior quality, "I suppose you can now make a pretty good hammer." The reply came instantly, "Sir, I never made a *pretty* good hammer."

Pleasure flies persistently from pursuit; but she comes to abide with the man who, instead of wooing her directly, gives his attention to the discharge of his duty.

One who has had no experience in pursuing a thing can have no conception of the pleasure of final accomplishment, and particularly of accomplishment under difficulties. One who has never been weary can have no appreciation of the comfort of well-earned rest; and the discipline and development growing out of these experiences are among the most valuable of every life. If we would only realize the fact—for it is a fact—that we have more reason for happiness in our daily work, with all its cares, and anxieties, and perplexities, and wearinesses, than would be possible for us to have under any circumstances that we could contrive for ourselves, we should see little occasion or pretext for downheartedness.

"Heaven is not reached at a single bound,
But we build the ladder by which we rise
From the lowly earth to the vaulted skies,
And we mount to the summit round by round."

We have great encouragement to begin tasks in the fact that beginning is usually the most difficult part. It has been well said that every quarter of an hour well or ill spent makes it easier or harder for us to spend the next quarter of an hour well. Every time we yield to temptation makes it easier for us to yield again. "We first endure, then pity, then embrace." Emerson says: "A great part of courage is the courage of having done the thing before; and in all human action those faculties will be strong which are used." The old proverb has it: "Choose that course of life which is the most excellent, and habit will render it the most delightful." One who is beginning to make a success is all the time getting farther and farther out on the long end of the lever.

Accompanying the feeling of success should always be one of caution. "Let him who thinketh he standeth take heed lest he fall." In the grandest success there is an element of danger growing out of that very success. Everything having been successful one comes to think that everything must be successful, and the great pre-requisites of care, discretion and vigilance, are neglected. Failures under such circumstances are most mortifying. None can remain stationary. We must all be making progress or falling behind. When one feels that he has conquered all his little world there is reason to fear that his little world has begun the conquest of him.

But a gospel of cheer is needed, not so much for success as for the want of success, ineffectual effort, failure; and that gospel is not lacking.

> "No endeavor is in vain;
> Its reward is in the doing;
> And the rapture of pursuing
> Is the prize the vanquished gain."

We often have the opportunity to learn more from our failures than from our successes. Every failure should be a rock upon which to securely base a success, and the adverse criticisms of ourselves, our friends or our enemies should help us to build up that success. And so in the discipline of all the trials and afflictions and so-called calamities of this world we should see blessings. "Our light affliction, which is but for a moment, worketh for us a far more exceeding and eternal weight of glory."

The finest porcelain is made from clay that has had severe grinding; and the noblest human natures that brighten this lower world have been refined and purified and ennobled through suffering. It is a wise philosophy that starts out foreseeing that "into each life some rain must fall," and is prepared to accept it as a part of experience that cannot be spared. Much disappointment may be avoided by not ex-

pecting too much,—by understanding in advance that the best laid plans "gang aft a-gley;" and much of everyday cheerfulness, after having used our best endeavors, comes from our being able to say: "I have learned, in whatsoever state I am, therewith to be content." Happiness comes not so much from the multitude of our blessings as from the proportion between our desires and our possessions.

We should be prepared for conflicts with depression, hypochondriasis; but even this need not be beyond our control. Stanhope says: "I am convinced that a light supper, a good night's sleep and a fine morning have sometimes made a hero of the same man who, by an indigestion, a restless night and a rainy morning would have proved a coward." A little sensible analysis of ourselves and our experiences will enable us in a degree to set aside abnormal suffering of this kind. For real sources of annoyance, anxiety or regret that may arise in our practice, or in our relations with the world in any way, no better suggestion has been made than that given by Dr. Edward Waldo Emerson, in his annual address in April last before the South Middlesex Medical Society: "We should ponder over troubles just so far as we can get profit from them in the way of help out of the difficulties, or avoidance of similar ones on other occasions, and then drop them." Similar doctrine is that which teaches we should not worry over, first, those which we cannot help; and, second, those that we can help. All that the past has in it of evil should be put under the feet; all that the present has in it of blessing should be enjoyed; for the future, cherish hope and work with courage. "Evil is like a nightmare; the instant you begin to strive with it, to bestir yourself, it is already ended."

CHILDREN'S TEETH.

Ed. Items:—I see in your July Items an article on deciduous teeth that is very sensible. These teeth are no doubt sadly neglected. If parents would take more care of their children's first teeth, it would be far better both for dentists and for them. The idea that these teeth don't amount to much is an error. Their preservation till the proper time for their absorption has much to do with the proper development and regularity of the permanent teeth, and the symmetrical formation of the features of the child. My practice is to save every temporary tooth I can till the corresponding permanent tooth is ready to make its appearance; and to take the utmost care to save the permanent teeth during the life of the patient. There are too many teeth extracted.

Though I am only a poor dentist away down in Maine, in a small town, so that I am not known to many of the profession, I manage to make an honest living, and, perhaps, do some good.

T. Bailey, S.D.

CHRONIC INFLAMMATION OF THE GUMS.

BY F. E. HOWARD, M.D.S., GENESEO, N. Y.

[Read before the Seventh District Dental Society, N. Y.]

Tartar is often the cause of the difficulty in the first form of inflammation of which I shall speak. After the inflammatory condition has existed for a long time, the soft tissues have become partly detached from the necks of the teeth, and recession of the gums has taken place, leaving pockets between the teeth for the retention of food and secretions, we find this state of things augmenting the condition materially. The calculus deposit is first established about the posterior and lingual surfaces of the inferior incisors and the buccal surfaces of the superior molars. At these points are found the outlets of the salivary secretion, from which we infer that the principal deposit is from the salivary glands, augmented probably by the mucus secretions. From these points of deposit the inflammation extends until sometimes every tooth in the mouth becomes involved

I believe it is conceded that in the aggravated stages, the salivary secretions are sluggish; the inorganic material not being held in solution until fairly ejected into the mouth, where it becomes deposited upon the surfaces of the teeth. A nucleus once formed, aggregation goes on until serious secondary lesions result, greatly augmenting the trouble. Attachment being made and not disturbed by proper brushing, the neck of the entire organ is eventually covered. This condition once established the gums soon lose their integrity, the roughened surfaces induce inflammation, which is accompanied by suppuration, and sometimes a false abscess is established. This condition progressing, the alveole is encroached, and as the result the exposed bone around the tooth becomes necrosed. This suppurative necrosed stage greatly augments the difficulty; the secretions are viscid, ropy, and gluey; the breath disgustingly offensive. This condition of the mouth, I believe, is sometimes the prime cause of general debility. For in this stage a general catarrhal condition is often manifested, and not a breath of pure air is taken into the lungs. When no bone or gum attachment is left, the final destruction of the teeth is the result. A happy state of things for the unfortunate patient, for when the teeth are gone the debilitated system gets rest, which often results in general health.

The other form of chronic inflammation of which I shall treat, is often due to hereditary transmission, and not so much from lack of attention on the part of the patient. This is a low form of chronic inflammation, invariably accompanied by suppuration and partial necrosis of the alveole. This condition is usually manifested in middle life and old age, and is due largely to the low degree of vitality. From

hereditary transmission, a lack nutritive element in the system at this time of life, together with the local irritation of slight deposits of tartar, and the density of the teeth, cause the breaking down of the tissues.

This form of chronic inflammation and recession of the gums, has been sometimes called "Riggs' disease." But I do not find that Riggs has done more to enlighten the profession on this subject than many others, neither has he projected a method of treatment in advance of other members of the profession.

I am much inclined to think that bacteria is one of the active agents in this destructive work of chronic inflammation of the gums. When once the inflammatory condition is established, it really looks as though a fine field for their operation was presented. The fetid breath, the character of the pus oozing from the gums, would indicate that this was a favorable play-ground for them. This condition of the mouth would really offer them a cozy place to work. When once a foothold is established and they are not overcome, why should they not work to the very end of the tooth and assist in uprooting it from the foundation? Is not this often the case? and do we not wonder at the active element in certain conditions in this work that baffles our skill? When once thoroughly established and carried beyond a certain stage, we must confess we are unable to control it.

TREATMENT.

The treatment of these pathological conditions consists of the thorough removal of all foreign substances, "tartar" being one of the exciting causes of the difficulty in the aggravated stages. This is accomplished by the use of scalers, chisels, etc., either by a pull or push cut. I am inclined to think that the opinion prevails among many that the instrument must be passed down below the deposit, and by a pull cut detached and removed. This is not at all necessary. Often an instrument in the form of a chisel will pass much further down, upon the roots of the teeth, and detach the deposit more effectually and with less pain to the patient. When once the connection is severed by the deposit being detached from the root, it is not necessary for its complete removal with the instrument, for nature will take care of any detached pieces; they will soon be expelled from the pocket, no matter what the situation may have been. When this has been thoroughly accomplished, which is seldom done at the first sitting when the case is an aggravated one, it is next necessary to polish all surfaces that have been encrusted with the tartar—under the gum and upon the crowns. This is best effected upon the crown surfaces with a stick of wedge-shaped orange wood loaded with pumice and silex. The roots under the gum surfaces are best polished with such shaped instruments as in general re-

semble scalers and chisels in form, and dull like burnishers. With such instruments the roots are left in a fairly smooth condition, which favors less the secondary deposit.

When the inflammatory condition has progressed so far as to involve the alveole, by causing a suppurative and necrosed condition to be established, a still more complicated operation may be pursued to advantage. The margin of the necrosed alveole may be removed with instruments that will pass around the root, cutting away the process circumscribing the tooth. This is easily accomplished with delicate chisels that will pass under the gum to the edges of the process. By passing this around the root of the tooth the desired portion is fairly taken off, leaving the parts in a condition to re-establish healthy granulations.

The operation should be followed by proper application of such remedies as in the judgment of the operator will meet the requirements of the case. Of these, for use under the gums, none perhaps is better for the first application than aromatic sulphuric acid, full strength and diluted, to be followed with chloride of zinc in the proportion of 1 to 2 of water, and weaker as the case progresses.

It is a disputed point as to whether the acid dissolves any remaining portion of the calculus. It however dissolves the inorganic matter from the diseased alveole where that is too weak to resist its action, and stimulating that less weak, it not acting upon healthy tissue by dissolving out the lime salts, but stimulating the parts to re-establish new granulations. It is therefore not absolutely necessary to excise the necrosed portion of the alveole, as the acid will do the work; but there is no objection, and possibly some advantages in this method of cutting away, for the work is facilitated, and advancement made by hastening the cure. Following this, at subsequent sittings, inject carefully with a hypodermic syringe, chloride of zinc in the proportion of 1 to 2 of water, sufficient to bathe all the parts where it is necessary to get a new attachment of the gum to the teeth. The coagulated substance from the juices of the tissues is obtained, and a new attachment in time will be secured. Sometimes when the periosteum is entirely lost, there is a mechanical adaptation that secures firmness. This is the condition of the parts with a "replanted" tooth retained; having been entirely stripped of its periosteum, it is sustained in position by this means. Tannin should at times be sprinkled upon the gums; it is a powerful astringent, and reduces the chronic inflammation rapidly. When the roots are stripped of the encrusting tartar, they are sometimes sensitive to thermal changes, acids, sweets, etc. The tannin having a strong affinity for the tooth element, unites with it and obtunds the sensitive condition to a great degree.

Give directions as to the manner in which the teeth should be brushed. A rotary motion of the brush should be given, from the

gums to the grinding surface, as well as crosswise. This will more effectually cleanse the teeth of foreign substances, largely prevent tartar from accumulating, and overcome the tendency of the gums to recede. A proper tooth powder, and an astringent wash should be used as a stimulant and tonic for the gums and a polisher for the teeth.

Facial neuralgia is often associated with this complication of the teeth. No cavities of decay being found, the patient is dismissed with the assurance that the teeth are not the cause of the difficulty. Chronic periosteal inflammation is often the cause of neuralgic trouble, and it is amenable to cure with proper treatment.

My experience is that no operation performed by the dentist in the mouth is more appreciated by the patient after they have seen the results of the successful treatment of these cases.

DR. J. TAFT, Editor *Dental Register,* says: I think it is good idea to determine at what period or periods caries is most likely to occur. During any condition of enfeeblement, the secretions of the mouth become vitiated, and the teeth in consequence more prone to decay. During the periods of gestation and lactation, they are less perfectly nourished, and necessarily become more susceptible to the influence of decaying agents. The largest proportion of decay of the teeth takes place at night, during the hours of rest. Throughout the day the secretions are most abundant, and the parts about the teeth are kept in motion in the acts of speaking and masticating. At night the organs are quiet, and the secretions in abeyance. Many persons acquire the habit of sleeping with the mouth open—the passing of air through it dries up the moisture, agglutinates the mucus, thus making the opportunity more favorable for putrefaction. In the morning there will be found in the mouth a "bad taste," this being caused by the vitiation of the secretions. When kept closed during the night these ill effects do not appear, and the mouth will taste fresh and clean. The agglutination of the mucus and its subsequent decomposition are the cause of the offensive taste and breath, to say nothing of the deleterious results to the teeth. I have given this subject some attention for some years past. Everything being equal, the mouth when kept closed will be in a better condition than when it is habitually kept open.

Iodide of Potassium in Headache. DR. HALEY says, in the *Australian Medical Journal,* that, as a rule, a dull, heavy headache situated over the brows and accompanied byl anguor, chilliness, and a feeling of general discomfort, with distaste for food, which sometimes approaches to nausea, can be completely removed, in about ten minutes, by a two-grain dose of iodide of potassium dissolved in half a wine glassful of water, this being sipped so that the whole quantity may be consumed in about ten minutes.

Miscellaneous Editorial.

THE HISTORY OF NITROUS OXIDE GAS.

As important as is nitrous oxide gas as an anæsthetic, its literature has not kept pace with its successes. Its improved mode of preparation and its almost absolute control in the hands of the intelligent operator, developed within the last ten years, has but a meagre and fragmentary record; while its abuse in the hands of the ignorant and unscrupulous has brought it into disfavor with those who should be its chief supporters and administrators.

Dr. Priestly, in 1776, gave the scientific world a slight glimpse of its character. By the action of bi-oxide of nitrogen on iron, he procured the protoxide of nitrogen, and thus produced some experiments which were interesting and instructive. But like many other lights which come flashing through the mind, this was not carried to any practical use.

In 1800, Sir Humphrey Davy became quite an enthusiast in its favor. He not only produced it, but demonstrated its usefulness as an anæsthetic. His experiments upon himself and others were wonderfully successful. It is more wonderful that all his successes were confined to his laboratory. While as a chemist and philosopher he gave the world light upon this new gas, which should have enlightened the whole scientific world, men looked on it only with curiosity, and the light went out. He even wrote a work demonstrating its practical usefulness; declaring it to be the long sought elixir of vital power; but they buried Sir Humphrey Davy, and with him his theory.

How hard it is to bury men's light as we do their bodies! It will work up through the sod, and though the struggle is for ages it will come forth to confront the incredulous. It may not put on the same phase, but the light is there and will not be extinguished. It took fifty years for Sir Humphrey's buried light to come to the surface again, and then it came, first, only to amuse the idle and the curious. Men and women chased after it as boys in their frolic tumble among the bogs to catch the ignis fatuus.

What a contrast between Sir Humphrey Davy in his laboratory, gravely throwing out to the world scientific facts which should have been caught by them, but were trampled under their feet, and Colton, fifty years later, upon the stage as a mountebank, with a lot of boys and girls amusing a gaping crowd by their antics under the exhillarations of this same gas! Yet the mountebank did what the philosopher could not do—he attracted attention. Among the curious who came

to see the fantastics produced by this "laughing gas," as it was now called, was Dr. Horace Wells, of Hartford, Conn. He became convinced from what he saw that this gas was an anæsthetic, and as such could be made an obtunder in the extraction of teeth. His first experiment was upon himself—Mr. Colton giving him the gas. It was a success. His tooth was painlessly extracted, and Dr. Wells immediately sought to make practically useful what had been, in the hands of Mr. Colton, a mere plaything.

It is strange that so little resulted from the experimentations and actual demonstrations of Sir Humphrey Davy. But so it is often that theorists do not make practical and useful their discoveries. It is still more strange that Dr. Wells did not push his practical successes to a final victory. Upon the very brink of his triumph he abandoned nitrous oxide gas for ether, and then ether for chloroform. Though his efforts with each were valuable, his difficulties were so great that in a fit of melancholy he committed suicide. Thus the course of new discoveries does not run smoothly, and those who are a little in advance of the masses are reminded of the necessity of much patience, perseverance, and moral courage. We are also reminded that many things we enjoy as common blessings have so gradually come to their present perfection, we hardly know who to credit as their inventors. Certainly Dr. Wells brought into a specific channel and gave direction to that which was going to waste as a mere curiosity. It had taken seventy years to make it a plaything, and though now its inestimable value was demonstrated as an innocent obtunder in minor surgery, both Wells and Colton soon ceased their efforts to harness it into actual service. Some time after the death of Dr. Wells, however, Mr. Colton again turned his attention to it as an anæsthetic during the extraction of teeth, and soon became famous. Though he was not himself a dentist, he employed those who were, and "Colton's Rooms" for the painless extraction of teeth, in Cooper Institute, became a household word. Other offices were opened from time to time, by Mr. Colton or through his influence, till scarcely a prominent city in the Union was without "Colton's Rooms." Other dentists also prepared the gas and used it for the same purpose, till it is now almost a necessity in every dental office.

The earache is frequently caused by disease of the teeth. Where this is the case it is folly to treat the ear to give relief. We must go to the cause. Not long since there was brought to our notice "a very stubborn case" of earache, which, though "it had baffled all ordinary skill," was immediately cured by the extraction of a diseased wisdom tooth.

SOME THINGS CURIOUS IN MATTER.

THE DIVISIBILITY OF MATTER.

There are some things almost beyond belief in the divisibility of matter. Think of the particles of strychnine being so disseminated through water that we cannot take a drop of it without tasting it, though but an ounce is mixed with 400 barrels of the water! For, to taste the strychnine, each drop must contain very many particles of it. An ounce of musk, put into a porous bag, will scent a room for a hundred years, without perceptibly losing its weight, though, to produce this constant scent, untold millions of particles of it must be constantly passing off. Did you ever contemplate the fine divisions of soap there must be in a soap bubble? It would take 2,500,000 films of soap bubbles to make an inch in thickness. As there is one hundred times as much water as soap in them, the molecules of soap must be one hundred times thinner than the film. But even then we have only reached a molecule. In each of these there are fifty-six atoms. Each atom, therefore, must occupy a space in the soap-bubble film so attenuated that it would take a trillion of them to make an inch in thickness! But what is a trillion? Suppose your age to be a hundred years, and that you have been counting at the rate of one every second of time, day and night, all your life, do you suppose you would have counted a trillion? That would be but boys' play at it. Suppose you had began where your father had left off, after a hundred years' counting, and that he had only taken it up where *his* father had left off, yet the whole of this would have been but the beginning of the count. If some one had commenced at the birth of Christ, and as that some one had died another had taken up the counting, at the above rate of one every second, and thus from generation to generation the count had continued without intermission till now, the half of the trillion would not be counted.

IS MATTER AT REST?

We have been taught that rest is the natural state of all matter. It is now doubted. The real inertia of matter is passivity—receiving motion and imparting it to other bodies, or continuing it within itself, according as it is acted upon or acts; so that motion once given continues, if not counteracted by some other force. In fact, motion itself is a form of matter. Scientifically speaking, therefore, matter is always in motion. As this great world is continually sailing through space, so every atom of matter of which the globe is composed has a motion of its own, and each atom has a sphere of motion. The molecules of the air are never at rest; so with those of water; and it is just as true of everything else, though not so apparent, because not to the same extent. We say metal expands and contracts. This is true, and it is

continually true. Now these changes require the continual movement of every particle of which metal is composed. The peculiar forces by which the rock is becoming harder or softer, more dense or more porous, receives infiltrations of metal or becomes disintegrated, are motions, and they are as constant as the motions of the earth itself. It took many years to turn trees into coal and oil, but it has been going on constantly and has been a series of motions from the beginning of the process.

THE INDESTRUCTIBILITY OF MATTER.

Matter is continually changing its forms and relationships. Its molecules are changing in the character of their atoms, so that the appearance of the mass constituting these changing molecules may appear very different at different times. It may crumble away into a powder or change from a solid to a liquid and from a liquid to invisible gases; but the matter thus changing is not destroyed. The earth is composed of as much matter as at creation—nothing is lost. A house may burn up, but the substances of which it is composed are not destroyed: they have simply taken other forms. Electricity may dissolve water so that it may seem to be annihilated, but the shock has only separated the two atoms of hydrogen from one of oxygen in each molecule of what was known as water. The elements of this compound continue in their gaseous form.

Matter, through all these changes, continues to have the properties common to any of its forms: magnitude, impenetrability, divisibility, porosity, inertia and indestructibility.

Magnitude, impenetrability, divisibility, porosity, inertia and indestructibility are general properties of matter. There are also properties of matter called specific, because they belong more specially to certain substances. Among these are:—

THE MALLEABILITY OF MATTER.

Do you observe the thickness of the paper of this page? Suppose it was of such a nature that it would divide into very thin lamina—just as thin as you can conceive of—and you tasked yourself to see how many you could make, how many do you think it would be? Twenty?—Yes, fifty or a hundred. They would then be almost too thin to see; and yet these would be thick and clumsy compared to the thinness with which gold may be beat out. *It would take two thousand of them to equal the thickness of this paper.*

Did you ever see the gold-beater at his work? The thick ingot of gold is first squeezed many times between steel rollers, these rollers being every time screwed nearer to each other, till the gold is lengthened into a ribbon about an eight-hundredth of an inch thick. It is now cut into small pieces, an inch square, and about 150 of these are put

between sheets of strong paper, four inches square. Then begins the pounding upon this pile of alternate layers of gold and paper, with a twelve or fifteen pound hammer. The strokes have to be delivered slowly and carefully, or the pile will heat. Gradually the gold spreads out between the paper till it has nearly covered the whole space—that is it has spread four times its original size. It is now taken out and quartered, making 600 pieces. These are placed separately between leaves of gold-beaters' skin and pounded till again by the beating they are spread over the four-inch surface. Once more they are divided into four pieces, this time making 2,400, and returned to the skin, to become a third time spread over the four inches, making now nearly 10,000 sheets. They are are then trimmed and twenty-five sheets placed in books containing 25 pages. If these sheets were only an eight-hundredth of an inch thick when the pounding commenced, what must be their thinness at the last? Dentists' gold foil is thicker than here described. The thickness is indicated by the number.

THE DUCTILITY OF MATTER.

This is still more wonderful.

For instance, a single grain of platina may be drawn into a wire a mile long. Gold will allow of a greater attenuation. As has been seen, the very great thinness with which gold can be beat is remarkable. Its property of ductility (capability of being drawn into a wire or tube) is still greater. Take an ounce of silver bar to serve as a "core." Coat this with gold foil, so that if you were then to remove the silver bar you would have remaining a golden tube. It would be so thin as to receive rays of light through it, and it would be very difficult to measure its thickness. But, instead of taking out the silver core, put them together into the machine for drawing out wire, and watch the process. You would finally have a wire fifty miles long, no larger than the finest hair; yet the whole length would be covered with gold. If it was so thin as to be translucent in the first place, how inconceivably thin it must be now! There is no computation by which we may estimate it. Yet such wire is in actual use.

Chains of metal are very strong, but a wire is much stronger. This latter quality is called tenacity. Steel is so tenacious that, drawn into a wire it will sustain seven miles and a half of its own weight.

ELASTICITY OF MATTER

Is more universal than is generally supposed. A stone or a hard metal does not look elastic. Strike a rock with a hammer and it does not seem to be compressed by the blow. Yet compression is necessary to elasticity. When you allow a soap bubble to fall on the table the underside becomes flattened, and if it it did not stick or burst it would rebound. Do you think this would be so with an ivory ball? Let one

fall upon a marble slab that has been oiled. If you observe closely you will see that the size of the impression will vary according to the distance of the fall. The diameter of the mark indicates the amount of the flattening upon the surface of the ball. This will be so with a ball made of glass or marble or metal, though not to the same extent. This is elasticity by *compression*. Till recently it was supposed liquids could not be compressed; but this is a mistake, though the amount of their compressibility is slight. Their elasticity equals their compressibility, because, as soon as the cause of their compression ceases, they rebound to their original capacity.

The gases are very elastic. Fifteen pounds to the square inch reduces them one-half, whereas water by this compression is only reduced two-hundred-thousandths of its size. There is a difference also in the gases. The atmosphere itself can be compressed to a perfect fluid. A hundred gallons of nitrous oxide gas compressed to a pint becomes a fluid. In this state it is sent all over the country in strong iron cylinders. The moment, however, these fluids or gases are set free, they rebound to their original size, which shows their elasticity. Singularly, the resistance to confinement diminishes as gases enter a fluid state, so that nitrous oxide gas, for instance, can be kept and transported in a liquid state much more safely than in the form of compressed gas, though the latter takes up more room than the former. When this fluid is still farther compressed, so as to become frozen, it has still less resistance to confinement.

Just the opposite to this quality of elasticity by compression is elasticity by *expansion*. This is not possessed by gases, and only slightly by fluids. Yet, try the following experiment, and you will see that water has some elasticity. Suspend a drop of water on the tip of a glass stopper or rod. Now touch it by a piece of glass and pull it down till it brakes from your piece of glass. You will observe that the drop of water elongated quite considerable, and when it separated from your piece of glass it made an immediate rebound to a spherical form.

In mouths where the alveolar process is much shrunken, and has to be well built up with rubber to support the teeth, the vulcanite surface all round towards the cheeks and lips is usually made convex, rounded, and smooth. I, on the contrary, make as deep a groove as possible, and one-quarter of an inch wide if I can. At the sides the bellies of the buccinators fall into the groove, and in front the upper crescent of the orbicularis oris; thus these muscles, instead of being antagonistic, assist in keeping up the plate; indeed, I have seen an imperfectly fitting plate retained in this way by muscular action only.—*W. A. Hunt.*

Miscellaneous.

SOLDERS AND SOLDERING.

The operation of soldering, says the *English Mechanic*, appears, as it is in fact, a very simple one; but simple as it may be, it is only the practised hand who can turn out a really creditable piece of work, even in the ordinary tinman's line. The amount of practice necessary depends, in a great measure, on the natural ability of the tyro; but a little patience and a fair amount of perseverance on the part of amateur mechanics will, as a rule, enable them to solder up ordinary work in a manner as serviceable, if not so neat, as that done by the professional. It may be of assistance if we give a brief account of the process and of the solders used for joining the different metals. Soldering is of two kinds—that in which a more or less fusible alloy is placed between the two portions to be joined, and that in which the metal itself is made to unite, a process known as autogenous soldering, and in some cases termed "burning." The principle of soldering consists essentially in creating a temporary or rather incipient fusion of the parts to be joined, by the direct application of heat, or by means of a fusible alloy which will, when in the state of fusion, unite with the metal or metals to be fastened together. In the latter case, it is obvious that the metal or the alloy forming the solder must be more fusible than the metals to be soldered, and, moreover, must have a chemical affinity for them. But although there must be an appreciable difference in the temperatures of the points of fusion, as a general rule the smaller the difference—or, in other words, the nearer the fusion point of the solder approaches that of the metal to be joined—the more perfect the joint; for, as just mentioned, the nearer the parts can be brought to a state of fusion the neater and stronger will be the union, the solder having then formed a true alloy with the metal to be soldered. It is also essential, for this formation of a true alloy, that the parts should be perfectly clean and free from oxide, and that they should remain so during the whole operation. To insure this state of things several substances are employed, chief among which may be mentioned sal ammoniac, chloride of zinc, rosin, and tallow. The effect of all these fluxes, as they are termed, is the same; they merely preserve the metals from being oxidized, a process which goes on very rapidly when metals are melted, and are not protected from contact with the air. The chloride of zinc, which is hydrochloric acid (muriatic, spirit of salt) "killed" with zinc, that is to say, acid which has been supplied with all the zinc it can dissolve, melts over the surface of the work, removing any trace of oxide that may have formed since cleaning, and also acting as a covering from the

air. Sal ammoniac, containing hydrochloric acid, acts in a similar manner, and rosin and tallow have the effect of temporary varnishes, preventing the surfaces from oxidizing. The methods of effecting fusion are almost as numerous as the solders themselves; the principal are the copper bit, tinned at the part applied to the solder, the heated iron, which does not require tinning, and the blow-pipe flame. For certain operations in the way of soldering, commonly called brazing, the heat of a fire or of a muffle is required, while for others the articles are dipped in melted solder, or melted solder is poured on the joint, and in some cases the heat is applied by a stream of heated air.

Of all the solders, those formed of differing proportions of lead and tin are by far the most numerous and probably the most useful, if we take into consideration the variety of their applications. For different purposes, they are mixed in widely varying proportions; but the ordinary solder of the shops and commerce is known as either hard or soft solder, tinman's solder, plumber's solder, coarse, common, and fine, being all names for an article which is possibly never twice alike. The sealed plumber's solder (of the Plumbers' Company of England) contains two parts of lead to one of tin, and melts at 440° Fahr., or about the melting point of tin; but a solder made of equal parts of the metals is sometimes used, though rarely, as it is, of course, considerably dearer. Soft solder consists of two parts of tin to one of lead, and melts at 350° Fahr., or thereabout. It is said to be the ordinary solder used for joining tin plates, and with the addition of one part of bismuth forms ordinary pewterer's solder. As a matter of fact, however, the solder found in commerce generally is known as coarse, common, and fine; and the respective proportions of the metals are supposed to be —for coarse, two parts of lead to one of tin; for common, equal parts; and for fine, two parts of tin to one of lead. These proportions can generally be detected in the manufactured article, for coarse solder exhibits on its surface small circular spots, caused by a partial separation of the metals on cooling; but these are wanting when the tin exceeds the lead, as in fine solder. The great bulk of the solder made in this country comes from manufactories where it is made a specialty; but many of the larger firms who use it make their own, probably from having been disappointed in the quality of the goods bought of others. In the ordinary solder of commerce it is very rare that the tin exceeds the lead, and No. 1, or hard solder of the shops will, as a rule, be found to vary between one and a half to two of lead and one of tin. The common stuff—that which plumbers use for making wipe joints in lead pipes—contains from two and a half to three parts of lead, and one of tin. Such a mixture as this melts at less than 500°; that is, considerably below the melting point of lead, and has the property of remaining semi-fluid for some little time, so that, with a thick pad anointed with

grease, the plumber is able to mould it to any desired shape. To render the solder hard without increasing the proportion of tin, some makers add a little antimony or copper, which has the effect of raising the fusing point without affecting the other qualities of the alloy. Although we have spoken of hard and soft solder in regard to alloys of lead and tin, it is better to retain the names now employed in commerce, coarse, common and fine. The mechanic, by "hard solder," understands an alloy for uniting metals that are difficult to melt, such as compounds of copper and zinc, sometimes with a little tin—brass, in fact. Hence the term brasing has been substituted for soldering.

The Hygiene of Shoes.—That the shoes we wear are seldom made of the proper shape has been often pointed out by scientific writers; but habit and fashion are not easily changed. The poor suffer more from this cause than the well-to-do, for cheap shoes are generally worse in pattern than more costly ones, and, being clumsier and less flexible, cause greater distortion to the feet. Deformities of the feet and toes are especially frequent among the poor.

This matter was the subject of an able and interesting paper, read by Colonel Ziegler, Chief Surgeon of the Swiss army, at the Geneva Hygienic Congress. He stated that every year 800 recruits are rejected for malformation of the feet, resulting from badly-fitting shoes. The foot is in reality a bow, so elastic that at every step it contracts and expands, lengthens and shortens, and a line drawn through the centre of the great toe intersects the heel. Shoemakers do not give room enough for the lateral extension of the great toe, confining it until it is forced against the other toes, giving rise to inflammations, corns, ulcerations, and sometimes true articular inflammations. Another evil is flat-footedness, whereby the arch of the foot is converted into a straight line, and prolonged walking rendered impossible. Another cause of this defect is the carrying of heavy weights at an early age; but in most cases perfect shoes would restore the foot to its normal condition. A test of a perfect pair of shoes is that when placed together they should touch only at the toes and heels; the soles should follow the sinuosities of the feet, and to give room for their expansion should exceed them in length by fifteen or twenty millimeters.—*Popular Science News.*

The Scientific Californian, San Francisco, Cal., is a spicy, newsy, sensible sheet, edited by W. O. Thrailkill. Such publications are a credit to the State.

"*Clearing the mouth*" for the insertion of a full artificial indenture is often a reproach and a shame to the profession. If there are teeth which, by judicious treatment, can be saved, by all means save them.

OUR DRINKING WATER.

The microscope is certainly doing one good thing for us: It is at least showing us the infirmities of much of our drinking water. Some of our wiseacres tell us there is no pure water, in the popular sense of the term—that all contains minute living creatures; and that water not "alive" with them is insipid, their presence being an evidence of the good quality of the water, on the same principle that fish abound only in healthy water. These statements are erroneous. There is plenty of pure water, and, generally, that containing animalcula of any description should not be drank.

Water abounding in these wrigglers is found in the stagnant pool, not in the fresh, bubbling spring. And the wholesome water of our wells is but water tapped as it flows from underground living springs. If the well is so constructed as not to allow surface water to drain into it, these animalcula will not be present.

But even this beautiful spring water may be contaminated by running through marshy, miasmatic lands, or by taking the drainage of pastures, hog-yards, or the general filth contiguous to dwellings. Brooks, however pure, receiving the drainage from these sources, are rendered unfit for use.

Because our drinking water is clear is not a sufficient evidence of its purity. The idea that ice is necessarily pure is an error. Many species of these minute living creatures, and of vegetable poisons, are not made innoculous by severe cold or by freezing. Water made dark by the presence of certain minerals or vegetable extracts is not necessarily unwholesome. Some medical springs, actually muddy from earthy and mineral ingredients, may contain just what the system requires; though many of these "medical waters" are not medical at all, and even if they are good for some things they are by no means good for everything, and may be decidedly injurious in some pathological conditions of our bodies. The benefit of a visit to a mineral spring may be derived as much from rest as from the healing qualities of the water.

To tea and coffee are ascribed many virtues which should be put to the credit of the hot water. If we all used the latter more for its own sake, in the simple form of "Adam's Ale," it would be quite as beneficial as when the tea or coffee are added. In fact, the medical qualities in either of these popular beverages are not as prominent as is generally supposed, and there is no nourishment. It sometimes seems as though a cup of tea is so invigorating that it would sound strange to have one suggest that the hot water taken clear would be just as good; and yet this is quite probably the case. In many herbs and berries—tea and coffee among them—there are certain medical qualities of use in some ailments; this may be so even with a decoction of tobacco, but is this

a reason why their continuance should become a habit, and that in all conditions of the system?

Hot water is a natural element. When you think you must have "something stronger," try this. In a short time it will be found pleasant and beneficial, without the possibility of taking into the system those chemical poisons so often found in our tea.

If those living in marshy districts, or parts of the country where the water is unwholesome, instead of making this an excuse for drinking stimulants, would quench their thirst with hot water, they would act wisely. The animalcula of such water are destroyed by the boiling.

Some persons traveling in certain foreign countries, drink wine, beer, etc., because of the bad water. Perhaps they do not reflect that these drinks are made mostly of the very water they reject. Besides, most of these beverages contain drugs quite as injurious as the badness of the water, and the alcohol produced by the fermentation is the most poisonous of all.

The water of almost any country will be made tolerable, and generally entirely healthy, by boiling; it is still better if drank hot.

A NEW FLOOR COVERING.

A new and desirable papier mache process for covering floors is described as follows: The floor is thoroughly cleaned; the holes and cracks are then filled with paper putty, made by soaking newspapers in a paste made of wheat flour, water and ground alum, as follows: To one pound of flour add three quarts of water and a tablespoonful of ground alum, and mix thoroughly. The floor is then coated with this paste, and then a thickness of manilla paper is put on. This is allowed to dry thoroughly. The manilla paper is then covered with paste, and a layer of wall paper of any style or design desired is put on. After allowing this to thoroughly dry it is covered with two or more coats of sizing, made by dissolving one-half pound of white glue in two quarts of hot water. After this is allowed to dry, the surface is given one coat of "hard oil-finish varnish," which comes and is bought already prepared. This is allowed to dry thoroughly, when the floor is ready for use. The process is represented to be durable and cheap, and, besides taking the place of matting, carpet, oil-cloths or like covering, makes the floor air tight, and can be washed or scrubbed.—*California Architect.*

Many pulps of teeth are exposed by careless excavation of cavities. If we are as careful with our patients as we would like to have a dentist careful with us, there would be much unnecessary pain avoided and many less teeth pulps "jammed into."

WHAT CIRCULATES THE BLOOD.

William Harvey's theory of the circulation of the blood, promulgated with its proofs in the seventeenth century, although stoutly resisted by medical men at the time, has been universally accepted as true. He held that the dynamical starting point of the blood was in the heart, not in the liver, as had been the generally approved notion.

According to his view the ventricles are muscular sacs which squeeze the contained blood into the aorta and pulmonary artery, creating a constant stream moving between the extremities and the lungs.

But this is an age of distrust and unrest. The expansion of knowledge is loosening the very earth clutched by the roots of formulas and beliefs long thought to be firmly established and unassailably fixed.

Science is penetrating everywhere, wresting from nature a clear and full explanation of her most occult processes. Time-honored conclusions are brought to the test of a vast accumulation of new facts, and forced to broaden their foundation or surrender altogether.

This spirit of skepticism has assaulted part of Harvey's theory of the circulation of the blood. It is claimed that propulsive power assigned to the heart implies an amount of constant strain upon the arteries which these vessels possess no sufficient visible means to resist, and that there are certain relations of the pulse to breathing which are not covered by the accepted theory. The substituted one is so novel, so remarkable and plausible that it is worth a place in our columns, if for no other purpose than to stimulate inquiry.

O. S. Fowler, the phrenologist, is the author of this new theory, which he publishes and defends in one of his late volumes. He claims that electricity is the motive agent, the office of the heart being to regulate, cut off, and measure the blood, not to create its propelling force.

According to this view, the inspiration of air into the lungs charges the distended cells there with electricity to their fullest extent. All positive electric bodies propel those of the same sort, while positives and negatives attract each other. The breathed-in air positively electrifies the lung cells which hold it. A thin film separates the air-cells from the blood-cells, the latter containing blood which has returned from its circuit to be vitalized, and which is in the negative state.

The iron in that devitalized fluid attracts electricity from the air-cells until a momentary equilibrium is established, whereupon the law of repulsion comes into action, and the blood which has been rendered positive rushes off, vivifying the muscles of the heart and replenishing all the forces of circulation.

So soon as the electricity has been consumed in carrying on the various operations and functions of the life process, the blood is left again in the negative state, which causes it to be again attracted back to the lungs, where the positive state is steadily maintained in unend-

ing series, by the periodic inhalation of air. This electric theory of the dynamic power of the circulation is put forward as more rational than the theory that the muscular contractions of the heart literally drive the blood without assistance from any other source.

This view is supported by a reference to sundry well known facts, as, for instance, the running or other exertion which increases the frequency of breathing, augments the number of heart and pulse beats, while holding the breath acts at once to slow the pulse, and soon to diminish the action of the heart. It is also said that the first pulse-beat after an inspiration is stronger than those which intervene before the next inspiration, and that the decreased force of the pulse while holding the breath for a minute or more, is instantly restored to fulness by breathing. Further, it is pointed out that every effort to resuscitate a person nearly dead from drowning is directed to the restoration of the circulation, not by efforts upon the heart itself, but by inflating the lungs and renewing the breathing power.

Whether or not this is the true explanation of the circulatory power of the blood, we cannot undertake to judge. It seems, however, to be very simple, plausible, and adequate, and is in consonance with growing belief that electricity is closely allied with all living organisms, and that man himself is a complicated piece of electrical machinery. As one province of the press is to set men to thinking by spreading before them an intellectual meal, we place this dish along with the rest.—*Chicago Herald.*

Lime Juice in the Treatment of Diphtheria.—A California physician, Dr. Czartoryski, who lived long in the interior of China, found that the Chinese place great reliance—in epidemics of diphtheria—on the internal use of the fresh juice of limes, and of the fruit itself, which they consume in enormous quantities in every conceivable form, as lemonade, with native spirits, cut in slices, etc., during attacks of this dreadful disease, with apparently most successful results, it hardly ever failing to effect a cure. The Chinese consider it a specific, and will, in case of need, do anything to obtain a supply. Since, he has used limes and their juices in California and Louisiana, in his practices, with most successful results, in cases of diphtheria, even the most desperate. "As soon as I take charge of a case of diphtheria, I order limes to be administered as freely as possible, in any manner the patient can be prevailed upon to take them, especially in the form of hot lemonade, sweetened with white sugar or honey, or cut in slices, with powdered white sugar." Besides lime juice, which he supposes acts by imparting an excess of oxygen to the circulation, and thereby prevents the formation of vibrione, etc., he prescribes whatever drug may be indicated by symptoms, and imparts strength by appropriate stimulants and nourishment.—*Condensed from Scientific American.*

FOREST ECONOMIES AND FIRE-PROOF HOMES.

The following is an extract from a paper on the above subject by Geo. May Powell, in No. 274 of the *American Architect*, Boston, Mass.:

In respect to materials and methods of construction of such buildings as seem desirable to have, there is not room in this article for full discussion. Good, common burnt brick is among the very best of materials. In suitable proportions and positions, and properly combined with other materials, it will almost if not quite solve the whole question. These bricks may also be made hollow, and otherwise shaped so as to be available for other portions than plain main walls. When wood is used it should, as far as possible, be covered with masonry. *Salix fragilis* has been found, as reported on what we believe to be good authority, very difficult wood to burn; its strength and lightness adapts it to many of the wants of the kind of architecture under consideration. Timber culturists may turn their attention to it, assured the time is near at hand when there will be more demand for it than supply. Other woods can be chemically so treated as to give them a high degree of incombustibility.

The tile roofs of Europe, with or without modern improvements, would save many a fire, now invited and rendered almost certain by shingled roofs. Tarred roofs are often little, if at all better than the latter. Scores of fires may thus be kindled in a half mile radius around some central fire, if that fire happens to start in a dry time, and when a high wind is blowing. To have one of these incendiary roofs on a building in a village, and especially in a large city, ought to be made an indictable offense. Slate roofs and other styles properly made are likewise among the best means of giving relief. Terra cotta offers a cheap, convenient and tasteful means of supplying a large share of ornamentation, now constructed of wood.

To Patch Rubber Boots.—The best cement for the purpose is made by dissolving virgin india rubber in bisulphide of carbon, so as to obtain a thick jelly. If the patch is to be placed inside, the cement is applied both to the boot near the tear, and to a piece of woollen cloth which is immediately fixed on and pressed. If the patch is for the outside, first rub off with sand paper any varnish that may be on the surface, then apply in the same manner already described a piece of the proper shape cut out from some old rubber boot. The cement sets at once, and completely dries in a few hours.—*Drug Circular.*

American Dental Association meets at Saratoga the first Tuesday in August.

American Dental Convention meets at Saratoga the second Tuesday in August.

Among our miscellaneous items is an article on fire-proof buildings, which should attract attention. Earth, stone, and iron, are nearly all the materials necessary for a house. Wood has so long been thought indispensable that its abandonment is very reluctantly considered, and the most frivolous reasons given for its continuance. Iron is now so cheap, and is cast or wrought so easily into desirable shapes that there is scarcely anything about a house which cannot be economically made of it. Cast iron pillars and wrought beams and frame work may be so constructed that they are in every way desirable. Sheet iron door and window frames and the doors and sashes themselves may be had at very reasonable prices. Even iron floors, ceilings and roofs are desirable and may be made quite light. The entire walls may be made of it, but where stone, concrete or brick are used, iron can be employed instead of wood for all other purposes. We are too apt to associate great weight with the idea of iron for these purposes. Modern architecture is teaching us that for these purposes it need not be so very much heavier than wood, and yet be strong.

But where iron is thought unavailable, especially for the walls, stone, brick, mortar and terra cotta will go much farther as substitutes for wood than is generally supposed. The tiled roofs of Europe are durable and safe from fire, and their floors of this material are clean and durable, much cooler in summer and warmer in winter than wood.

Paper pulp is now being made into all kinds of materials for building and ornamentation, and is made incombustible.

Where wood is used it should be well covered so as to be unliable to conflagration, and it only needs a little ingenuity to have it so. The idea of having our doors made of metal may seem preposterous, but really very pretty patterns may be made of it. Some of the most ornamental doors in the Philadelphia Public Buildings are made wholly of metal.

Whenever the weather is damp, the wife of a well-known resident of St. Louis, whose name the *Republican* of that city does not mention, suffers mysterious and distracting pains, which she attributes to the bite of a dog received several weeks ago. At such times she becomes nervous and hysterical, imagines that she is pursued by dogs, alternately weeps and screams, and seems to be on the verge of hydrophobia. When the weather is clear and dry her condition is perfectly natural, and it is supposed that imagination is the soul cause of her distress, but her friends are fearful of the results.

Capping teeth with gold, or gold and platina alloy is much better than extracting them. Many teeth worn down almost to the pulps may thus be built up and saved for many years.

PHONETICS.

H ɥ	A a	Ʌ ʌ	Ǝ ə	I i	E e	ʎ ʎ	Ɔ ɔ	O o	U u	ꓤ ɹ	R r
*a*rm	*a*nd	*a*ir	*ee*l	*i*ll	*e*ll	*a*ll	*o*ld	*o*n	*u*p	*r*e	*e*r

ʆ ʆ	Ɯ ɯ	Ɐ ɐ	I ɪ	Q q	X x	ʍ ʍ	C c	⊥ ɟ	⅂ l	ꓘ ʞ	Ⅎ ɟ	⅁ ȣ.
t*o*	t*oo*	*a*le	*i*le	*oi*l	*ow*l	*u*se	*ch*u	*th*e	*th*in	*sh*e	*vis*ion	si*ng*.

Let us plɐs xr Lʎrd'z pɹɐr in fɔnetiks:

Xr Fɥɟr hɯ ɥrt in hevn. Halɔd bə ɟɪ nɐm. ⊥ɪ kiȣdum kum. ⊥i wil bə dun in ɾɟ az it iz in hevn. Giv us ɟis dɐ xr dɐli bɹed. And fʎrgiv us xr dets az wə fʎrgiv xr dets. Ləd us not intʃ temptɐꞁun, but dəlivr us from əvl. Fʎr ɟɪn iz ɟe kiȣdum, and ɟe pxr, and ɟe glɔri, fʎr evr. Ɐmen.

Fʎr if yə fʎrgiv men tʌr tɹespasez, ʍr hevnly Fɥɟr wil ʎlso fʎrgiv ʍ: but if yə fʎrgiv not men ɟʌr tɹespasez, nəɟr wil ʍr Fɥtr fʎrgiv wr trespasez.

ꓤədr, dɯ ʍ nɔ hx ʍ kan help tʃ bɹiȣ abxt fɔnetik speliȣ? Just tɐk ɟə abuv alfɐbet and Skriptʍr kɔtɐꞁun tʃ ɟe publiꞁr ov ʍr nərest nʍzpɐpr and hav it publikt. Nɔ nʍ tɪp iz nəded, and nɔ gɹɐt efɔrt tʃ put it up. Supcz it ɪz cnli lʃkt on az a novlti; it wil hav its efekt. Sum wil sə its merits and wont tʃ sə mɔr ov it. ⊥is wil kʎz mɔr tʃ bə publikt. It iz bɪ ɟəz smʎl bəginiȣz ɟat gɹɐt ɹəfʎrmz fɪnali bəkum popʍlr. But it nədz efʎt on ɟe pɥrt ov ɟɔz hɯ ɥr ɟe pɪɔnərz. If ʍ frst setl it in ʍr mind ɟat it iz a gʃd tiȣ, ɟen kumz ʍr dʍɟi tʃ help it on. But it iz hɥrd tʃ dɯ an unpopʍlɥr ɟiȣ. Wiɟ mɔst ov us it iz not ənuf tʃ nɔ ɟat it iz a gʃd ɟiȣ; wə must bə satisfɪd ɟat uɟrz wil ɭink sɔ tɯ, and ɟat wiɟxt giviȣ us a gɹɐt dəl ov tɹubl tʃ konvins ɟem.

⊥us wə ʎl lik tʃ tɹavl ɟə wel bətn tɹak. Hx fʍ ɟr ɥr hɯ ɥr wiliȣ tj help mɐk a nʍ ɹɔd ɟɔ konvinst it wʃd bə a muc betr and ꞁʎrtr wun ɟan ɟe cld. Iz ɟis kɹeditabl tʃ xɹ intelijens and tj xɹ filantɹɔpi? ⊥ɔ wə nɔ xɹ popʍlr speliȣ iz a jɥrgon ov ignʎrens, wə hɔld tʃ it az ɟɔ it wr wizdum; and ɟɔ it iz a vast taks on ɟe tɪm and lɐbr ov xɹ cildɹen, wə ɥr not filantɹopik ənuf tʃ ɹələv ɟem.

Hɯ ɥr wiliȣ tʃ bɹɐk ɐ nʍ rɔd and pɹəpʌr it fʎr uɟr pepl tʃ travl in? Hɯ ɥr wiliȣ tʃ bə rɪt and dɯ gɯd, ɟɔ it mɐ giv ɟem muc trubl and mɐk ɟem apər siȣʍlr?